A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

McGRAW-HILL PUBLISHING COMPANY, INC. • PRICE 20 CENTS

AUGUST
1944

PALM LEAF PANELS *for thatching roofs and sides of army barracks in Pacific war theaters are "prefabricated" on work bench improvised from perforated steel section of airfield surfacing mat.*

Inland Steel Piling — Dependable, Economical

In all parts of the country, from coast-to-coast—for locks, dams, docks, breakwaters, and numerous other applications—Inland Steel Sheet Piling is giving dependable, economical service.

Made of special analysis steel of unusual hardness, and tensile strength of more than 70,000 lbs. per sq. in., Inland Piling can be driven and pulled many times.

Inland engineers have had broad experience in working with contractors on piling jobs. They are ready to help you design for economy and fast erection, no matter how difficult the construction problems may be.

Sheets • Strip • Tin Plate • Bars • Plates • Floor Plate • Structurals
Piling • Rails • Track Accessories • Reinforcing Bars

INLAND STEEL COMPANY

38 S. Dearborn St., Chicago 3, Illinois

Branch Offices: **Cincinnati • Detroit • Kansas City • Milwaukee • New York • St. Louis • St. Paul**

CURRENT JOBS

. . . and Who's Doing Them

BUILDINGS

Public—Housing contract at Baltimore, Md., was awarded to **Ross Engineering Co.**, of Washington, D. C., for $3,350,000. **Louis A. Merlo,** of Windsor, Ont., will build 500 permanent houses for $2,750,000. Ore blast furnace and chemical plant at Rusk, Tex., will be constructed by **F. H. McGraw & Co.**, of New York, N. Y., for $2,500,000. Army contract for buildings, utilities and roads at Alameda, Calif., went to **Stolte Inc.**, and **Duncanson-Harrelson Co.** of Oakland, for $2,450,305. **John A. Johnson & Sons,** of Brooklyn, New York, submitted low bid of $2,335,916 for Army postoffice superstructure at Long Island City. Low bid of $1,197,000 was submitted by **W. E. Wood Co.**, of Detroit, Mich., for 475-unit temporary dwellings at Royal Oak. **Ford J. Twaits Co.**, of San Francisco, Calif., has $1,025,000 Army contract for postal concentration center at Oakland. **Jos. Weinstein, Inc.**, of Brooklyn, N. Y., submitted low bid of $993,333 for infirmary buildings at Coatesville, Pa. **Wigton Abbott Corp.**, of Plainfield, N. J., will build structural steel frame manufacturing plant additions at Punxsutawney, Pa., for an estimated $900,000. Contract for hospital buildings at Fort Custer, Mich., was awarded to **Patrick Warren Construction Co.**, of Chicago, Ill., for $848,000.

HEAVY CONSTRUCTION

Contract for removing 2,000,000 tons of rock from open pit mines near Sudbury, Ont., was awarded to **Don Construction, Ltd.**, of Toronto, for $3,000,000. Natural gas pipeline in Pennsylvania and West Virginia will be built for an estimated $2,700,000 with various sections handled by **Monongahela & Ohio Dredging Co.**, of Pittsburgh; **B. & M. Construction Co.**, of Oklahoma City, Okla.; and **Pipe Line Construction Co.**, of Harrisburg. Army contract for $2,600,000 climatic hangar and test room at Eglin Field, Fla., went to **J. A. Jones Construction Co.**, of Panama City. Navy contract for $2,341,340 railroad line in state of Washington was awarded to **Sound Construction & Engineering Co.** and **Peter Kiewit Sons,** of Seattle. Airport at Dubuque, Ia., will be built by **McVaugh-Haynes Co.**, of Peoria, Ill., for $1,581,806. **J. A. Casson & N. M. Ball Sons,** of Hayward, Calif., will widen runways at Fairfield Suisun Air Base for $1,192,963. **Puget Sound Bridge & Dredging Co.**, of Seattle, Wash., has $1,000,000 Navy contract for dredging Puget Sound area. Airport contract at Quincy, Ill., was awarded to **Cheney-Wright,** of Williamston for about $1,000,000. **T. G. Meyer,** of San Francisco, has $999,033 Army contract for parking apron at Hamilton Field, Calif. **E. B. McGurk, Inc.**, of Hartford, Conn., was awarded $500,000-$1,000,000 contract for airport development at East Hartford. **Peter Kiewit Sons Co.**, of Denver, Colo., submitted low bids of $458,340 and $597,216 for paving two 5,000-ft. runways at Sheridan, Wyo., airport.

HIGHWAYS

Among recent highway contract awards are the following: Florida: $423,454 to **L. J. & W. L. Cobb, Inc.**, of Tampa. Indiana: $294,623 to **Grace Construction & Supply Co.**, of Fort Wayne; $265,137 to **Rieth-Riley Construction Co.**, of Goshen; and $197,177 to **McCalman Construction Co.**, of Danville, Ill. Missouri: $323,583 to **M. E. Gillioz Construction Co.**, of Monett, and **L. V. Hites,** of Kansas City; and $170,882 to **Koss Construction Co.**, of Des Moines, Ia. North Dakota: $248,616 and $164,393 to **Inland Construction Co.**, of Omaha, Neb. Oregon: $376,678 to **P. W. Yett,** of Portland. Pennsylvania: $200,609 to **Standard Construction Co.**, of Waynesburg; $216,889 to **Walker Bros.**, of Chambersburg; and $221,545 to **Cornish & Dickerson Coal Co.**, of Uniontown. Tennessee: $600,978 to **Foster & Creighton Co.**, of Nashville; $455,660 to **Chandler Bros.** of Virgilina, Va.; and $419,271 to **Harrison Construction Co.**, of Pittsburgh, Pa. Texas: $334,668 to **Austin Road Co.**, of Dallas; and $212,000 to **Texas Bitulithic Co.**, of Dallas. Utah: $489,000 to **Gibbons & Reed,** of Salt Lake City. Wisconsin: $228,810 to **Kramp Construction Co.**, of Milwaukee. Quebec: $220,000 to **Page Equipment & Construction Co., Ltd.**, of Three Rivers.

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

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Editorial Staff: Vincent B. Smith, Paul Wooton (Washington)
N. A. Bowers (San Francisco) Nelle Fitzgerald
Patricia McGerr

AUGUST, 1944

THE *How* OF IT

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

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McGRAW-HILL PUBLISHING COMPANY
330 West 42nd Street, New York (18), N. Y.

Director of Circulation:

Please change my address on Construction Methods

From .....

.....

To .....

.....

Signed .....

THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS

"Hi'ya, hot stuff!"
"Hello, subgrade!"

"You're too heavy for the roller, Gilhooley. You've got her sinking into the asphalt."

BIG PLUS WITH 'INCOR' IN SUMMER

SIZZLING DAYS and hot winds dry out concrete . . . make it necessary to run back to the job for days, to keep ordinary concrete wet. And it MUST be kept wet . . . strength, wear-resistance, water tightness depend upon it. 'Incor' concrete gains strength fast, cuts curing time to one day. This means

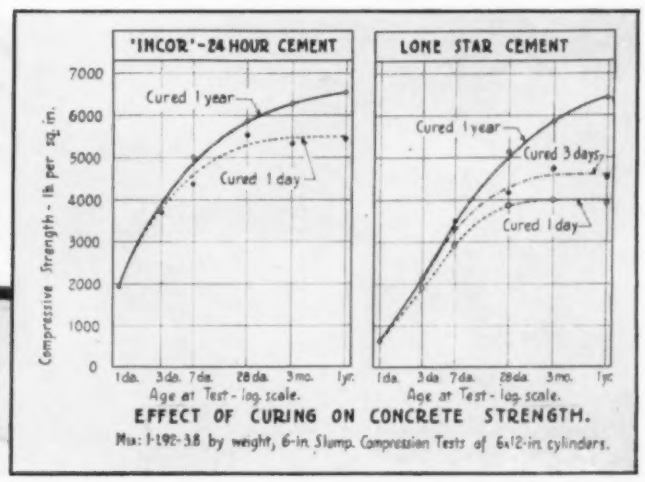
DURABLE, WATERTIGHT CONCRETE

GREATER WEAR-RESISTANCE

OVERNIGHT SERVICE STRENGTHS

REDUCED CONCRETING COSTS

Plan and build with 'Incor'* 24-Hour Cement for quality, speed and economy. *Reg. U. S. Pat. Off.



EFFECT OF CURING ON CONCRETE STRENGTH.

Mix: 1-1.92-3.8 by weight, 6-in. Slump. Compression Tests of 6x12-in. cylinders.

LONE STAR CEMENT CORPORATION

Offices: ALBANY • BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON • INDIANAPOLIS • JACKSON, MISS. KANSAS CITY, MO. • NEW ORLEANS • NEW YORK • NORFOLK • PHILADELPHIA • ST. LOUIS • WASHINGTON, D. C.

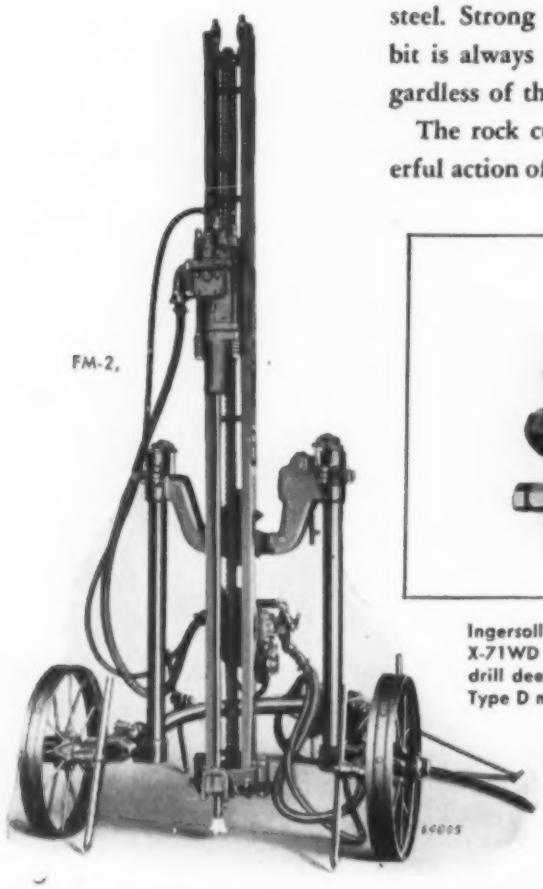
LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 15 MODERN MILLS, 25-MILLION BARRELS ANNUAL CAPACITY

The X-71WD drill is designed especially for deep-hole drilling. Its heavy piston, the heaviest used in any hammer drill, has an extremely long stroke and hits the drill steel a solid, powerful blow.

Added to this slugging power is a unique follow-through characteristic which overcomes the inertia of heavy drill steel. Strong rotation results; hence the bit is always taking deep, fresh bites regardless of the hardness of the rock.

The rock cuttings created by the powerful action of the drill are easily removed by a new method of blowing which greatly reduces the loss of air around the drill steel shank. As a result, the high pressure so necessary for cleaning deep holes is maintained.

These operating features, plus the ruggedness and stamina which are essential qualities of a champion, will help you drill more feet of hole day in and day out. The use of Jackbits in conjunction with the drilling power of the X-71WD will give you even better results. Jackbits are available in sizes ranging from 1⅜ to 4½ inches.



X-71WD Drill

Ingersoll-Rand has developed two wagon mountings to provide portability for the powerful X-71WD Drill. The FM-2, shown at the left, is an extremely flexible 3-wheeled mounting. It will drill deep holes at any angle and will handle six-foot steel changes. Then there is the improved Type D mounting which is used for 10 or 15-foot steel changes, and for holes to a depth of 40 feet.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

5-380

Do BOTH Jobs Efficiently!

● With modern loading units and Bottom-Dump or Rear-Dump EUCLIDS you can move more dirt on both long and short hauls at lowest cost per yard. Using efficient digging and loading tools and Euclid equipment to haul economically is the surest way to keep costs down and profits up.

Euclids are designed for faster, easy loading under large shovels, elevating graders, draglines, transfer bins, etc. From bumper to bumper they are constructed for efficient off-the-highway service, and have proved their versatility and lower operating cost on hundreds of the toughest jobs.

If you need hauling equipment now for an essential project or are planning for future requirements, be sure to get literature and specifications on models for earth, rock, coal and ore. Your Euclid distributor will welcome an opportunity to provide information, or write us if you prefer.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLID SELF-POWERED HAULING EQUIPMENT
For EARTH ROCK COAL ORE

BAKERS *ON THE BIGGEST CONSTRUCTION JOB IN HISTORY* —WORLD WAR II

Top: Baker building road in New Caledonia.
Center: Making fuel "dumps"; Fiji Islands.
Bottom: Dozing trees for air base; Australia.
Bakers are on every front.

So you think Boulder Dam and the Panama Canal were big jobs? They were pikers compared to the construction job of them all—World War II. More earth is being moved, more trees dozed, more roads, bridges and buildings built and more buildings razed than on any other job at any time.

It's taking an endless amount of construction equipment of all kinds, including Baker Bulldozers and Gradebuilders by the hundreds.

This *Biggest Construction Job* calls for speed—that's where Bakers come in. Powerful hydraulic down-pressure on the blade bites deep into Italian lava, Algerian sand or South Pacific coral —gets full loads faster. Too, Bakers are as simple as they look—fewer parts—easier to maintain. No wonder the boys in the Seabees and the U. S. Engineers swear *by* them—not *at* them.

After monthly war quotas have been met, a few units are left for high priority requirements. If yours is a war job, you may be eligible. See your Baker, Allis-Chalmers dealer.

THE BAKER MFG. CO.
568 Stanford Avenue **Springfield, Illinois**

BULLDOZERS SNOW PLOWS **BAKER** CONSTRUCTION EQUIPMENT

...and
Not a Friend Kicked in the Teeth!

Judging from the advertisements, we seem to be one of the few factories that failed to win the War single-handed.

We did the best we could—***we increased our output of war materials 2000% over normal peace-time production, and we were voluntarily handing back our excess profits to the government before re-negotiation ever went into effect***—but, to be perfectly honest about it, we were so badly scared after Pearl Harbor that we would have promised to do twice as much with no profit at all if it would only help keep our country from going down in the shambles with the rest of the world. In other words: "When the Devil was sick, a Saint was he."

We did make one war-time record though, of which we're genuinely proud:

NOT ONCE DID WE EVER USE THE WAR AS AN EXCUSE TO DODGE A COMMERCIAL ORDER, AS AN EXCUSE FOR ROTTEN SERVICE, FOR SHODDY CONSTRUCTION, OR FOR ARROGANCE.

The Job We Did...

We ***fulfilled every single commercial order*** offered to us for which materials were legally available. We ***tackled every single repair job*** that anybody asked us to undertake. And, in spite of all the headaches involved, we managed to make pretty decent deliveries, and to keep the quality of workmanship up as high as was humanly possible to produce.

It sounds a little screwy for a Manufacturer to brag about doing the very thing a Manufacturer is supposed to do: Take better care of his Customers than any competitor possibly could. But it's not as easy as it sounds. In a war-order-gorged-plant it's a mighty temptation to use the war as an excuse to keep from "bothering" with a commercial order. The paper work alone involved in the appeals to Limitation orders, priorities, official correspondence, etc., is enough to make a factory want to duck the transaction. After the paper work has been ploughed through, the next job is to plead, threaten and curse to get in materials from our sources of supply. Then, all the Production Manager has to do is sweat blood to dig up enough man-power to get the work out some way ***without interferring with War contracts.***

And handling ***repair work*** under War conditions is a very special headache that should be reserved only for the most stubborn cases in Purgatory. Yet, we have completed job after job of repair work on equipment which the operator had purchased from our competitors. Incidentally we have never increased even by a fraction of a percent the normal peace-time profit on repair work.

The Seller's Obligation...

Our philosophy about ***taking care of commercial customers in War-time*** has been simple: Color and flavor the story any way you will, the inescapable ***fact remains that a Manufacturer lives off his Customers.*** No customers; no factory—and Lord help the Manufacturer who forgets it. If you want customers when the going is tough, you'd better take care of those customers when ***they*** have troubles.

If ever a corporation had reason to be grateful to its customers, Standard Steel Works has. We might not have weathered the depression years had it not been for staunch Customer-Friends who stood by us. And grand Customer-Friends of more recent years helped us to win national recognition in our manufacturing fields.

So, to us, these war years have been a golden opportunity to repay ***friends that we needed before the War—and that we are going to need more than ever after this War is over.*** If we say it ourselves, no Manufacturer ever tried harder under more difficult circumstances to pay his obligations in full.

ERECTING LONGEST WOOD TRUSSES EVER BUILT

BOOM-LOWERING DRIVE—Double No. 443 Diamond Roller Chains.

4 MOTO-CRANES TEAM-UP TO ERECT LONGEST WOOD ROOF TRUSSES EVER BUILT

USING 4 Moto-Cranes to raise thirty-one 200 ft. wood roof trusses on the new Ryan Aeronautical Final Assembly Building in San Diego, is a liftable idea submitted by R. E. Hazard & Sons, owners of 12 Lorains.

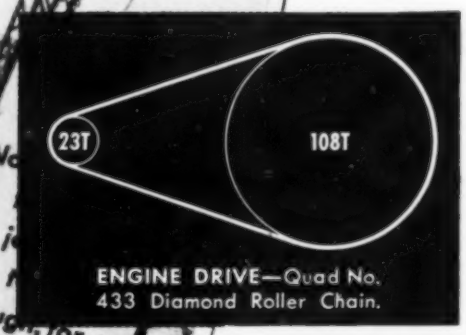
This job was not so much a matter of weight as one of mobility and accurate boom control. Equal distribution of the load had to be maintained to avoid any distortion or mistreatment of the arches while maneuvering each truss into the heel plate positions—an unusual operation, yet typical of the hundreds of varied jobs Moto-Cranes are performing daily.

Completely mechanized, Moto-Cranes are mounted on 10 rubber tires that cushion as well as speed their travel between jobs—are sure-footed and steady on off-the-road jobs, crawl along at a snail's pace or speed up to 35 M.P.H., and jockey into working position as easily as parking your car.

If mobility and maneuverability are essential on your material handling operations, you'll find it mighty profitable to apply Moto-Crane performance on your postwar jobs. See your Lorain distributor for details.

THE THEW SHOVEL COMPANY
LORAIN, OHIO

thew-Lorain
CRANES • SHO



ENGINE DRIVE—Quad No. 433 Diamond Roller Chain.

Where Boom Control *Accuracy* and *Sureness* Were Essential

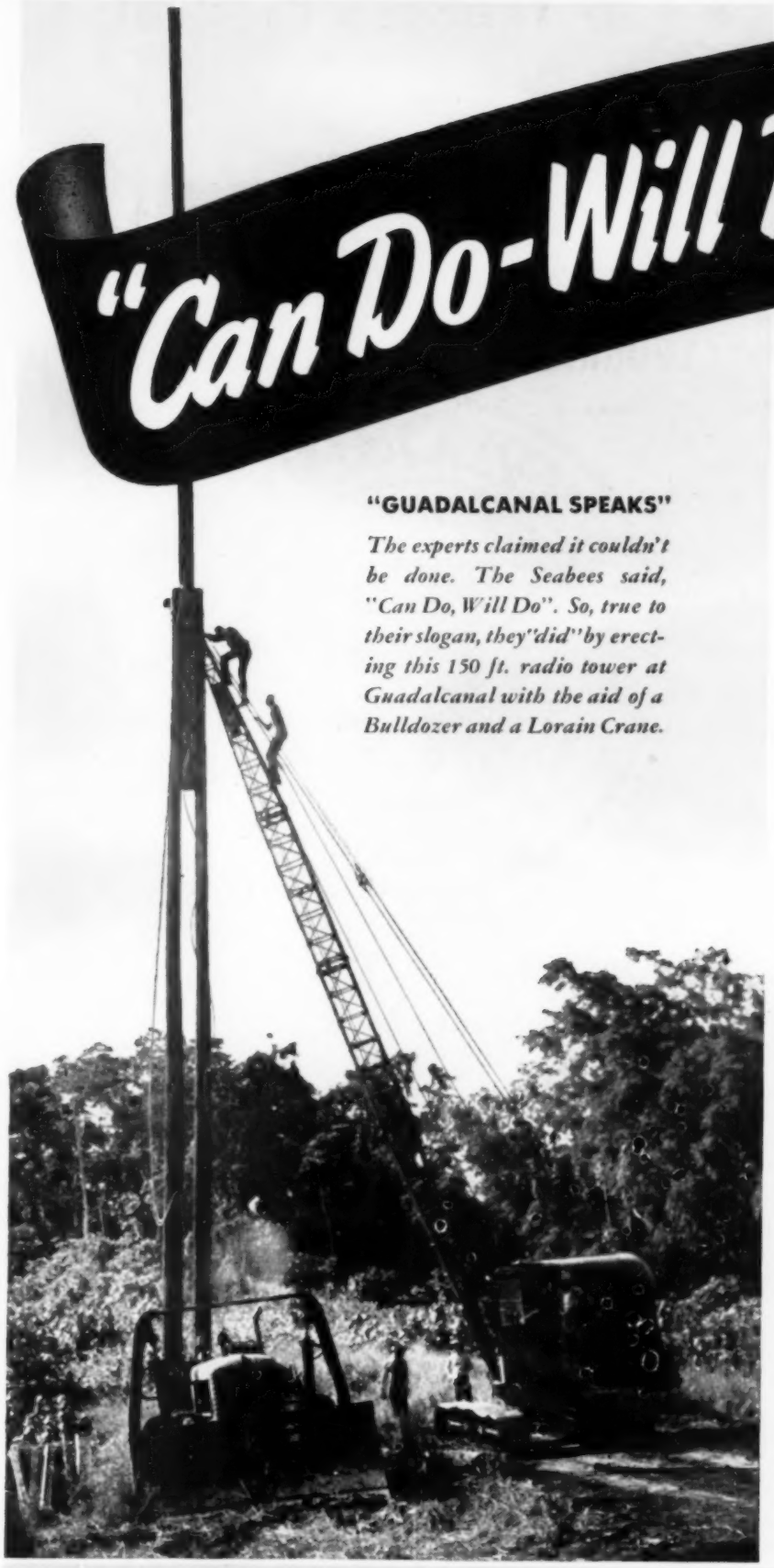
In erecting the world's longest wood roof trusses on the Ryan Aeronautical Final Assembly Building at San Diego, accuracy of boom control was essential to place the 200-ft. trusses while maintaining even distribution of the load.

The engine drive of the Lorain Moto-Crane, that provides the dependability of boom control, crane mobility and maneuverability, is DIAMOND ROLLER CHAIN, ¾″ pitch, 4 strands wide with a 23 tooth driver on the engine shaft, and a 108 tooth follower on the mainpower shaft. The boom-lowering drive is double strand, ¾″ pitch roller chain on a 34 tooth driver and a 39 tooth follower.

Thew-Lorain is another of the great American construction machinery builders regularly employing DIAMOND Drives—and on whose equipment the reserve strength, inherent elasticity, the sureness of power transmission and long-life performance of DIAMOND Drives have been demonstrated for many years. DIAMOND CHAIN & MFG. CO., 418 Kentucky Avenue, Indianapolis 7, Indiana. Offices and Distributors in All Principal Cities.

DIAMOND  **ROLLER CHAINS**

"Can Do-Will Do-DID"



"GUADALCANAL SPEAKS"

The experts claimed it couldn't be done. The Seabees said, "Can Do, Will Do". So, true to their slogan, they "did" by erecting this 150 ft. radio tower at Guadalcanal with the aid of a Bulldozer and a Lorain Crane.

DAILY, the list grows longer, the record more amazing, of the jobs being performed by the famed Seabees in the drive to Tokyo and Berlin.

And, closely related to the records being run up by these famed construction battalions, are almost unbelievable exploits of the tractors, bulldozers, shovels, and cranes that travel with them. We know, too, that among them are many noteworthy achievements of Lorains performing material handling jobs no one ever dreamed they would ever be asked to do, proving again their versatility, ruggedness, extra power and speed under the toughest imaginable conditions.

But, there are still bigger jobs coming up in the postwar period . . . when efficient and dependable equipment will be equally vital. And, because of Lorains' war-proven developments and performance you can figure on being in a better competitive position to *get* and *work* those big peacetime jobs—at a profit—with Lorains.

THE THEW SHOVEL COMPANY
LORAIN, OHIO

Official U. S. Navy Photograph

Reg. Trade Mark

thew-Lorain

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

How capacity and tractor speed effect

SCRAPER PRODUCTION

For obvious reasons, the following LaPlant-Choate scraper yardage table is *not* intended for estimating specific jobs. Its main purpose is to give you a conservative measuring stick for figuring the relative advantage of higher tractor speeds, or larger scraper capacities, on various length hauls. As such, we hope you will find it helpful in estimating the size, type and number of tractor-scraper rigs you will need for your post-war dirt-moving projects. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

ESTIMATED PAY YARDS PER HOUR WITH PRESENT LaPLANT-CHOATE SCRAPERS*

Scraper Model	Tractor Size	Struck Yds. Per Trip	Load, Dump	Turn &	Length of Loaded Haul in Feet								
				Time	250	500	750	1000	1500	2000	3000	4000	5000
C-74	D-7	9.5	2.5	min.	122	100	83	69	58	47			
C-84	D-8	13.6	2.5		145	117	97	88	64	50	41		
C-86	D-8**	15.3	2.5		175	130	109	98	74	58	51	46	
C-104	D-8**	25	3.5			172	148	123	100	88	70	55	45
CW-10	DW-10**	8.75	2.5			125	102	92	88	81	73	64	54

*Based on a one-way haul on level grade with good dirt and well maintained hauling roads. (54 minute hour used to allow for unpredictable losses). Above figures will change considerably depending on the type and condition of the material you are loading. They also will vary with the condition and grade of the hauling road. Proper maintenance of hauling roads increases production, decreases maintenance on equipment and gets the job done quicker.

**Indicates pusher loading. In figuring operating costs per cubic yard of material on different length hauls, the operating cost of the pusher unit should be pro-rated and added to the operating cost of each scraper unit. You will find that one pusher can load 3 to 5 scrapers, depending on the length of haul.

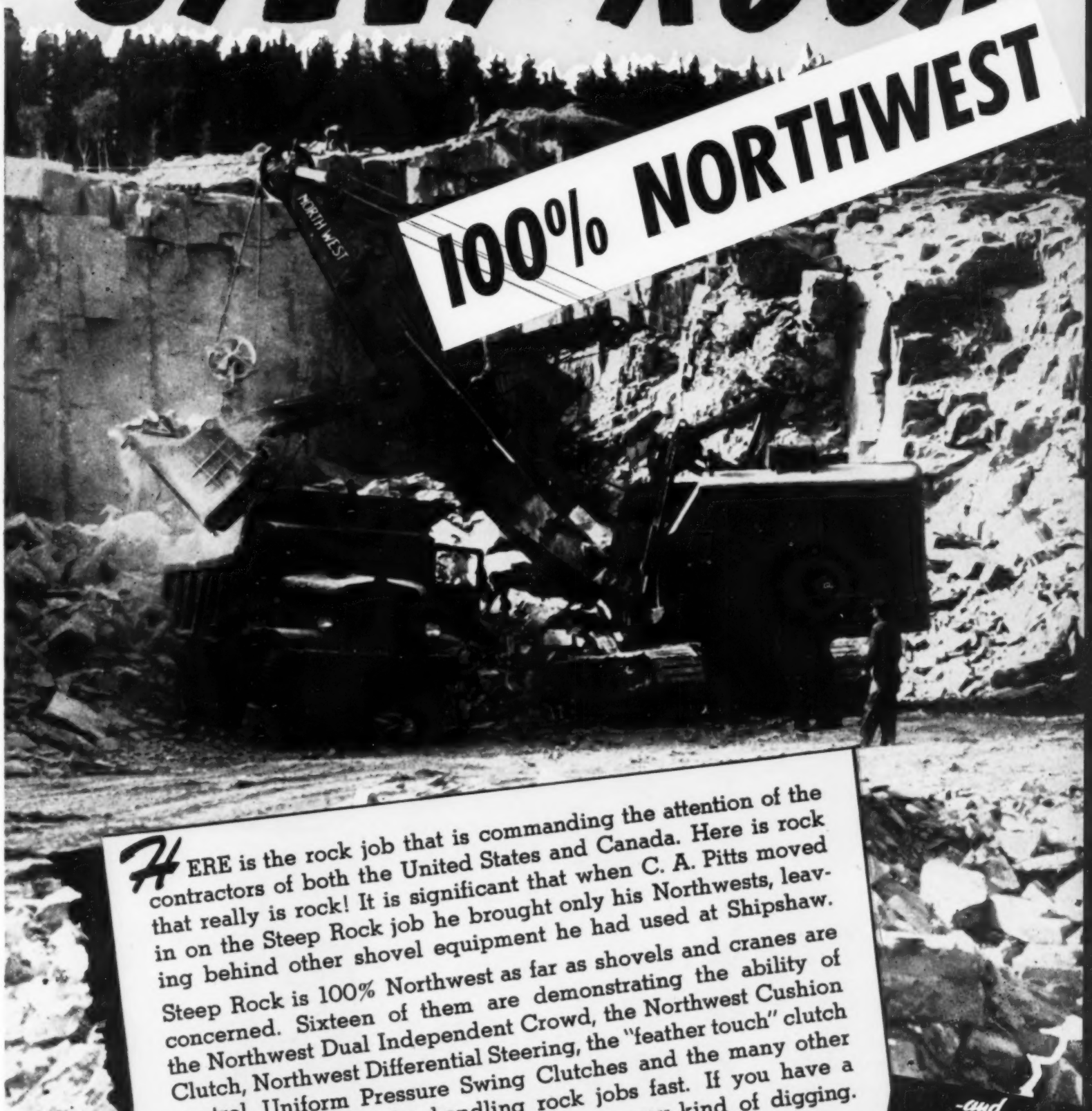
A Word About Tomorrow's LaPlant-Choate Scrapers

With tomorrow's LaPlant-Choate cable scrapers, you'll be able to get full loads faster and easier in all types of soil, including sand. In addition, you can count on greatly reduced weight, lower cable expense — plus a clean, open bowl that's free of overhead obstruction, for greater stability and for easy loading under shovel, drag line, or bin.

LaPLANT-CHOATE

Earthmoving and Land Clearing Equipment

STEEP ROCK



HERE is the rock job that is commanding the attention of the contractors of both the United States and Canada. Here is rock that really is rock! It is significant that when C. A. Pitts moved in on the Steep Rock job he brought only his Northwests, leaving behind other shovel equipment he had used at Shipshaw.

Steep Rock is 100% Northwest as far as shovels and cranes are concerned. Sixteen of them are demonstrating the ability of the Northwest Dual Independent Crowd, the Northwest Cushion Clutch, Northwest Differential Steering, the "feather touch" clutch control, Uniform Pressure Swing Clutches and the many other Northwest features for handling rock jobs fast. If you have a *Real* Rock Shovel you'll have output in *any* kind of digging.

NORTHWEST ENGINEERING COMPANY
1728 Steger Bldg., 28 E. Jackson Blvd., Chicago 4, Illinois

-and when you have a real Rock Shovel you won't have to worry about output in dirt

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

ATHEY FORCE-FEED LOADER

Helps Maintain 1600 Mile County & State Highway System

LaVern A. Kohn, Dodge County (Wisconsin) Highway Commissioner, has a lot of praise for their Athey Force-Feed Loader because "it has exceeded all of our expectations in its performance," to use his own words.

In maintaining Dodge County's 1600 miles of highway,

"Caterpillar" Motor Grader cleans out ditches.

including State highways in its care, the Force-Feed Loader is playing an important part.

Much of its present operation is cleaning up windrows of excess material removed from clogged ditches.

Their "Caterpillar" Motor Graders grade the ditches, throwing out windrows of sand, washed soil, sod and debris which has accumulated and interfered with drainage. The Force-Feed Loader quickly and easily picks up the material from the road surface and loads it into trucks, which carry it to a fill. Time and manpower are saved—material is salvaged.

"No other methods," writes Mr. Kohn, "could do the job as satisfactorily or economically as the Athey Force-Feed Loader."

Mr. Kohn also says, "The loader is used for handling loose rock, gravel, oil mix material and snow with completely satisfactory results."

Many other Highway Officials are using Athey Force-Feed Loaders on road maintenance and construction and finding them the lowest cost, most versatile loading tool available.

23 truck-loads in 25 minutes!

Write today to your Athey-"Caterpillar" Dealer or to Athey Truss Wheel Co., 5631 W. 65th St., Chicago 38, Ill., for a new folder describing the Force-Feed Loader.

After the Athey Force-Feed Loader and "Caterpillar" Motor Grader have finished the job.. Wide, clean drainage ditches and road surfaces mean better highways for Dodge County, Wisconsin.

ATHEY

FAST, DEPENDABLE LOADING EQUIPMENT

First-Class Fighting Machine

TALK to a fighting man back from battle and you'll hear him speak of "Caterpillar" Diesel equipment with affection. He knows that, out there, when they need "workpower" they count on "Caterpillar" Diesels. War dramatizes the dependability of these husky power-plants. For a single power failure may cost lives.

It was in the years before the war on the highways, on construction jobs, in logging camps and oil fields and on farms that "Caterpillar" Diesels matched their dependability against the toughest kinds of jobs that could be found.

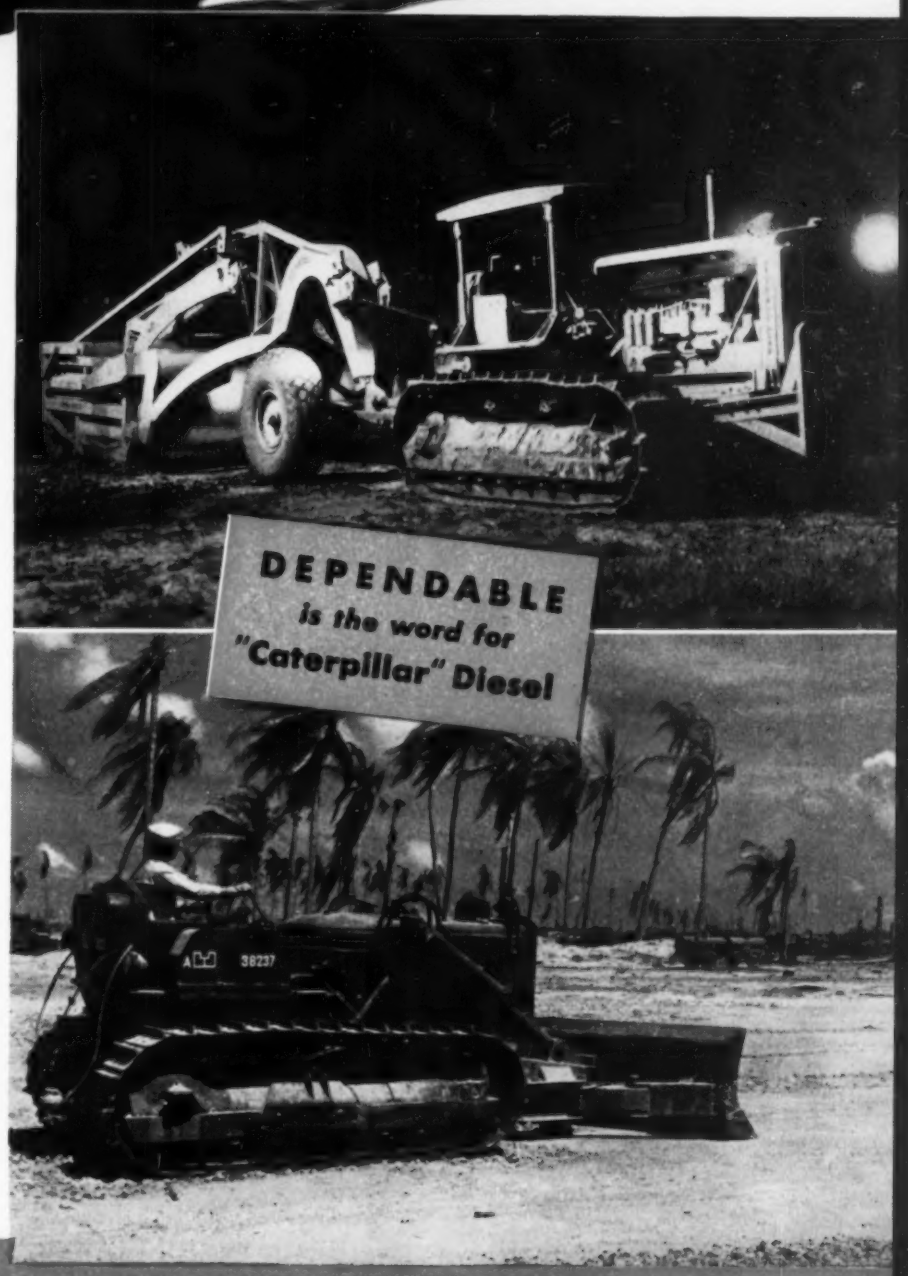
Through those years, the men who built them were watching them perform. Owners of "Caterpillar" equipment were urged to give it more and harder work to do. After many thousands of hours of service, engines were torn down and studied. At the first sign of an on-the-job weakness—no matter how slight—"Caterpillar" trouble-shooters went after it . . . *and corrected it!*

So, when the armed forces asked for dependable power, it was just a question of stepping up production of the same machines which had been proved over so many years.

When the war is done, the biggest production of "Caterpillar" Diesel Tractors, Motor Graders, Engines and Electric Sets in all history will be ready to tackle the countless tasks that peace will bring. They won't be streamlined "dream" models, but they will be modern, battle-tested "Caterpillar" Diesels—the same kind that are with our troops around the world today.

Meanwhile, your "Caterpillar" dealer is equipped to render complete and efficient service to help keep your present "Caterpillar" equipment on the job—working at peak efficiency.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

TO WIN THE WAR: WORK—FIGHT—BUY WAR BONDS!

IN MATERIALS as well as in men, the test of character is not how they meet the ordinary requirements but how they stand up under stress and strain.

Thermoid Products are widely employed on nearly every kind of construction job. But we are especially proud that so many contractors insist on their use on the tough ones!

Thermoid Hose (air, water, suction and steam), Thermoid Conveyor Belting, Industrial Brake Linings are built to meet unusual conditions—and experience proves that they do!

Learn to "rely on Thermoid". Our products' reputation for outstanding service has been earned the hard way—*on the tough jobs!*

THE THERMOID LINE INCLUDES: Transmission Belting • F. H. P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products • Molded Hard Rubber and Plastic Products

Thermoid Rubber

DIVISION OF THERMOID CO.
TRENTON, NEW JERSEY

It's good business to do business with Thermoid

"MORE THAN 10% INCREASE IN GASOLINE MILEAGE!"*

Ring-Free removes carbon. Keeps pistons clean, rings free. Reduces power loss.

Ring-Free's high film strength and long cling make bearings last longer, even under overloads.

Ring-Free holds foreign particles in suspension... stops sludge formation, reduces port clogging.

You'll move more tons of material per gallon of fuel consumed if you use Macmillan Ring-Free Motor Oil. That is a simple statement of fact, and the reasons are very easy to explain.

It takes *power* to move material. It also takes power to *overcome internal engine friction.* The more internal friction is reduced, the more power you'll have for hauling material, or other productive work.

Ring-Free Motor Oil cuts friction-power-loss materially, because it *reduces friction fast.* It lubricates better because it removes carbon, has high film strength, long cling and thorough penetration.

*TESTED AND PROVED ON THE JOB

Operators everywhere find their engines run better and last longer when lubricated with Ring-Free. Power is increased, shut-downs and repairs are decreased. Operating and maintenance costs go down, production and profits go up.

You, too, will notice *immediate improvement* when you change to Ring-Free. Give it the hardest tests you can, on your toughest jobs. It will effectively answer many of your difficulties.

***"*For the past seven years I have been using Ring-Free Motor Oil in my fleet. I get from seventy to eighty thousand miles before changing motors or being forced to make any major repairs. I never have any sticky valves and but slight traces of carbon, and my gasoline mileage has increased more than ten per cent.*"**

Henry J. Schafer, Jr., Pres.
Schafer Brothers Trucking Corp.

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN PETROLEUM CORPORATION

50 W. 50th St., New York 20, N. Y.; 624 S. Michigan Ave., Chicago 5, Ill.; 530 W. Sixth St., Los Angeles 14, Calif.

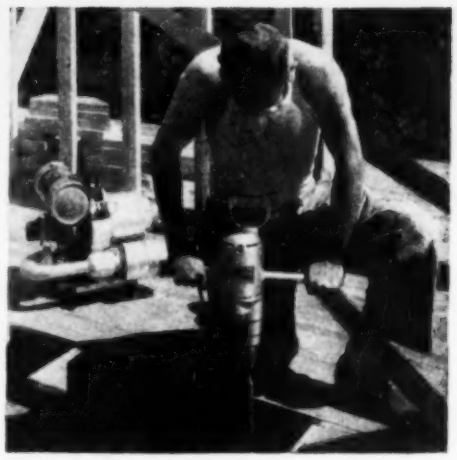
HOT . . . but not bothered

And when we say "hot", we mean 120° in the shade . . . and of course, much hotter inside the gasoline engine of a Homelite Portable Generator. But there's no question of "burning up" . . . for the engine is air-cooled. There's no radiator to boil over or run dry.

A large fan on the flywheel sends a constant blast of air over the cylinder. Shields direct this air across the fins of the aluminum cylinder . . . providing maximum cooling. Complete lubrication is assured . . . for oil is mixed with the gasoline and sprayed under pressure into all moving parts. No sludge . . . no dirty oil . . . for a fresh, clean film of oil enters the crankcase with each revolution.

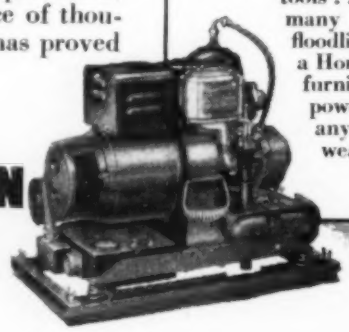
And the most interesting thing is this . . . the means of protecting a Homelite from heat, is also the means of protecting it from cold. There's no radiator to freeze. And lubrication is the same hot or cold . . . for oil mixed with gasoline won't congeal, even at sub-zero temperatures.

From broiling tropical heat down to sub-zero arctic temperatures, a Homelite performs without trouble. The performance of thousands of Homelites with the armed forces everywhere has proved this point *plenty*.



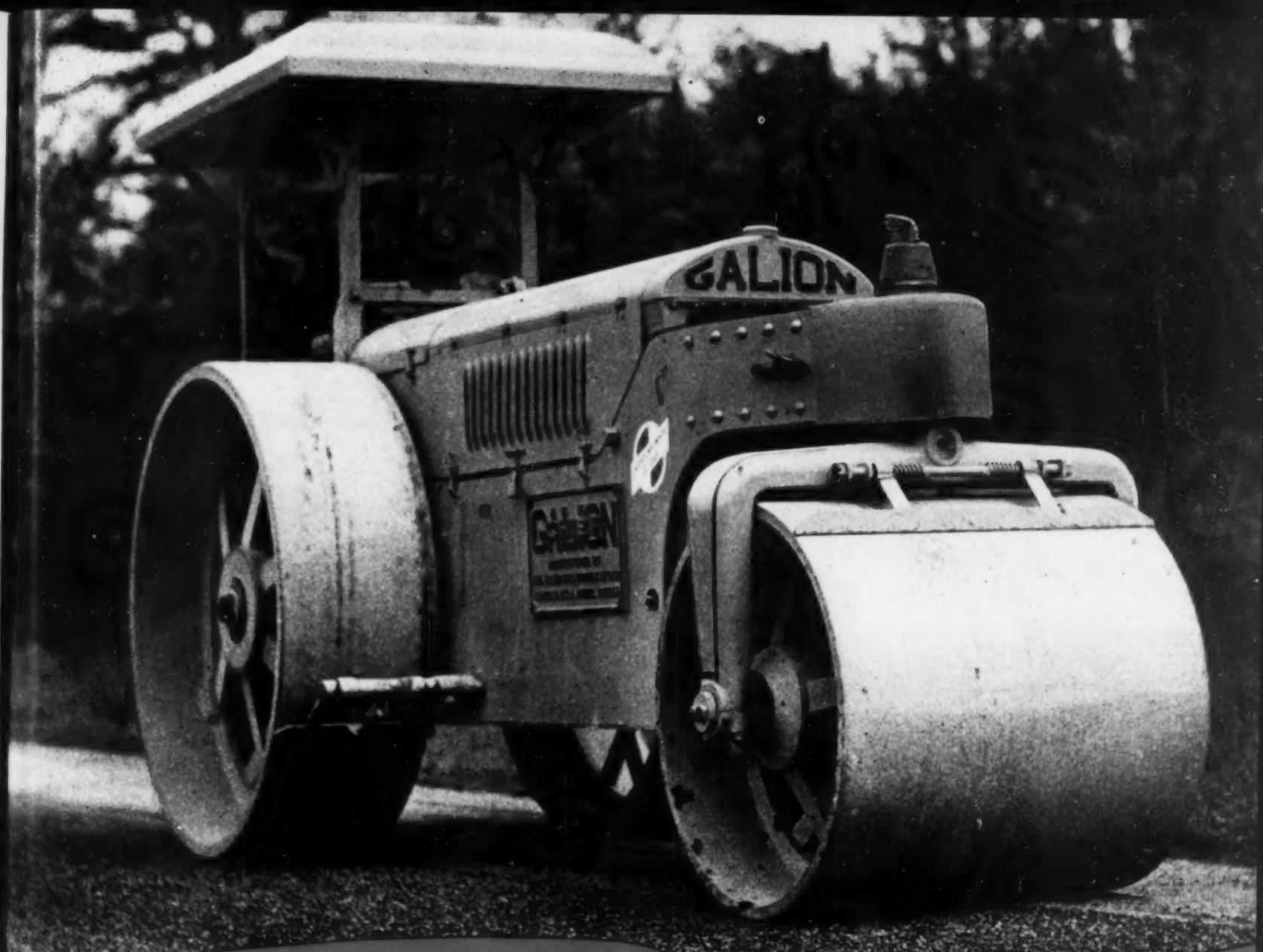
Contractors have to play ball with the weather. They have to work on the coldest day in winter and the hottest day in summer. And the equipment used must work also.

For operating small portable power tools . . . drills, saws, sanders and many others as well as operating floodlights . . . you can depend on a Homelite Portable Generator for furnishing a steady, dependable power supply 24 hours a day . . . any day . . . any kind of weather.



HOMELITE CORPORATION

PORT CHESTER, NEW YORK



MILITARY ROADS – LANDING FIELDS

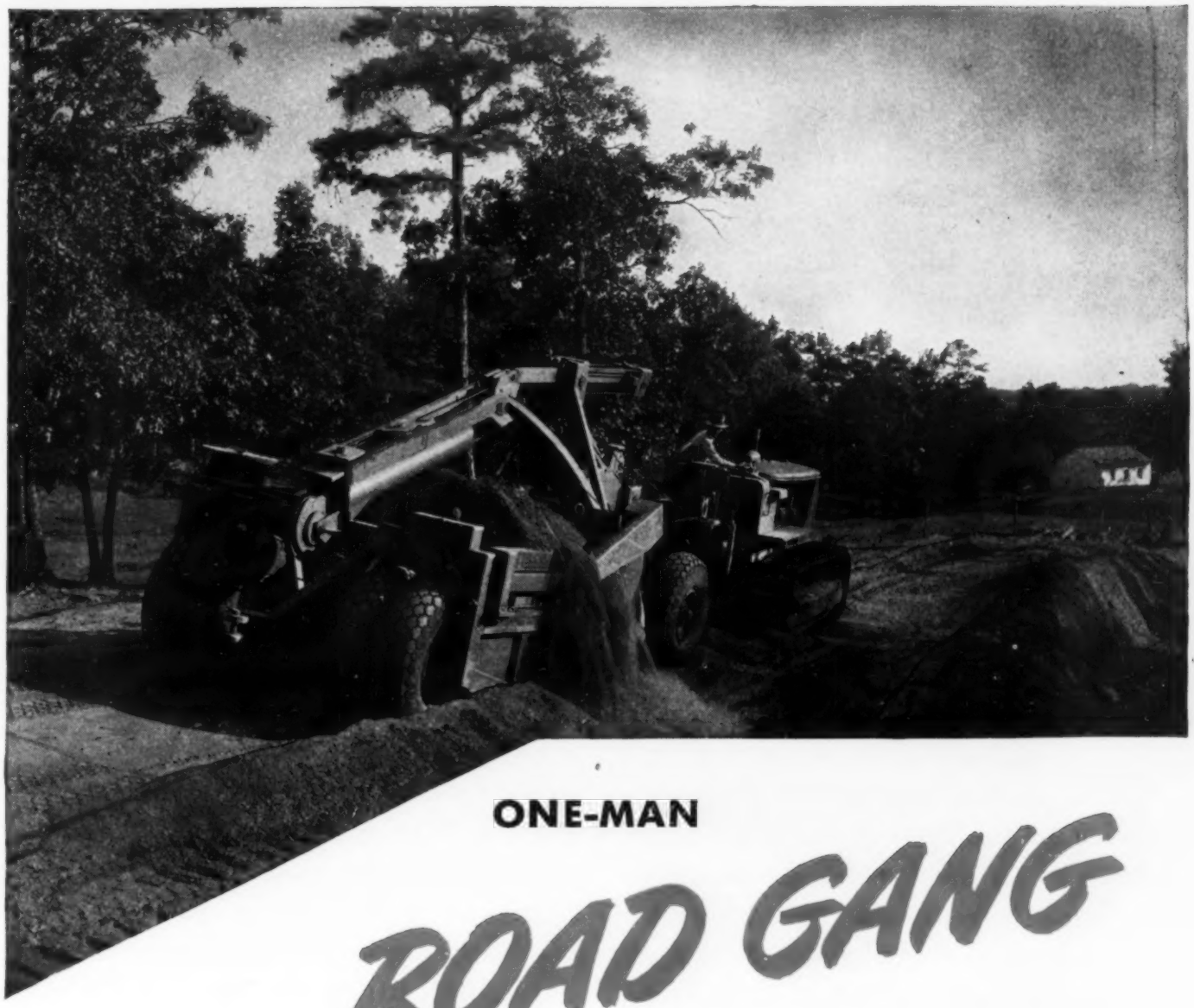
Wherever There is Construction Activity

There you will find Galion rollers and motor patrol graders. Rugged and efficient units for the tough jobs . . for top performance in road building and maintenance. Galion equipment has been called upon to do its share in military construction . . will be called upon in the post-war period when even more progressive construction will be the order of the day. Remember Galion when you plan that better road for a better tomorrow.

THE GALION IRON WORKS & MFG. CO.

MAIN OFFICE AND WORKS: GALION, OHIO

1907 **GALION** 1944



ONE-MAN

ROAD GANG

A GOOD example of how modern equipment helps contractors get their jobs done on schedule is this Le Tourneau Carryall and Caterpillar Tractor combination—a one-man operation.

On roads at home . . . on airfields at the front . . . wherever any type of contractors' equipment is used . . . one indispensable safeguard of dependable performance is effective lubrication . . . *Texaco!*

Texaco Marfak, for example, used in your tractors, shovels, bulldozers, trucks, etc., provides ideal film lubrication inside a bearing, yet maintains its original consistency at the outer edges . . . sealing itself in, sealing out sand, dirt, water. Its tough adhesive film cushions chassis parts against road shocks. Makes parts last longer.

For wheel bearings, use *Texaco Marfak Heavy Duty.* It stays in the bearings —off the brakes. Seasonal repacking is no longer required.

Texaco lubricants have proved so effective in service that they are definitely preferred in many fields.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States.

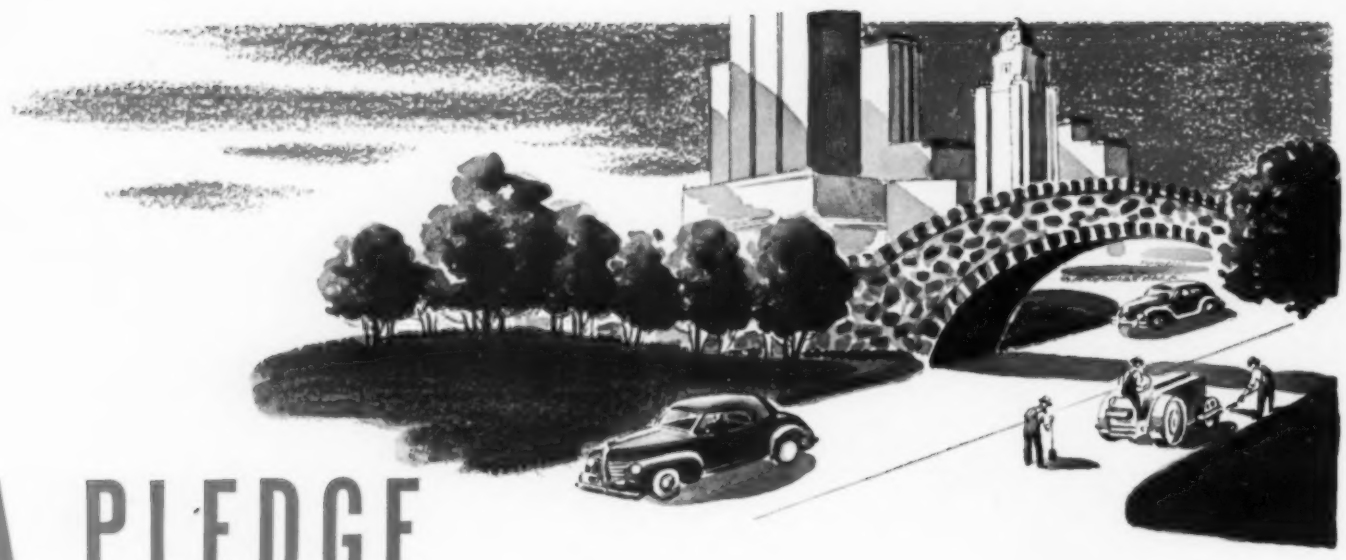
The Texas Company, 135 East 42nd Street, New York 17, N. Y

FREE! 36-page booklet explains new low-cost protection against rust. Tells how to make equipment last years longer. Write for your copy.

TEXACO

TEXACO MARFAK

TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY



A PLEDGE

FROM THOSE WHO BUILD HUBER ROAD MACHINERY

A trip through the HUBER plant today would reveal a modern, fully equipped machine shop and assembly lines with every facility manned by men with years of experience in building dependable road machinery. To make the most of these manufacturing facilities and talents and to insure a uniform flow of production, new methods of doing things have been adopted.

It is within these up-to-the-minute surroundings that the best work of HUBER engineers will be transformed from blueprints into highly efficient and dependable ROAD MACHINERY that will live up to the high standards of performance you have a right to expect of it.

It is the sincere pledge of those who build HUBER ROAD MACHINERY that every roller, maintainer, bulldozer, sweeper, mower and snow plow, leaving the plant, will reflect the best skill and workmanship each man has to offer — that each machine will represent the soundest and most economical investment money can buy. This, backed by practical engineering and sound management, is bound to win confidence for HUBER ROAD MACHINERY after the war.

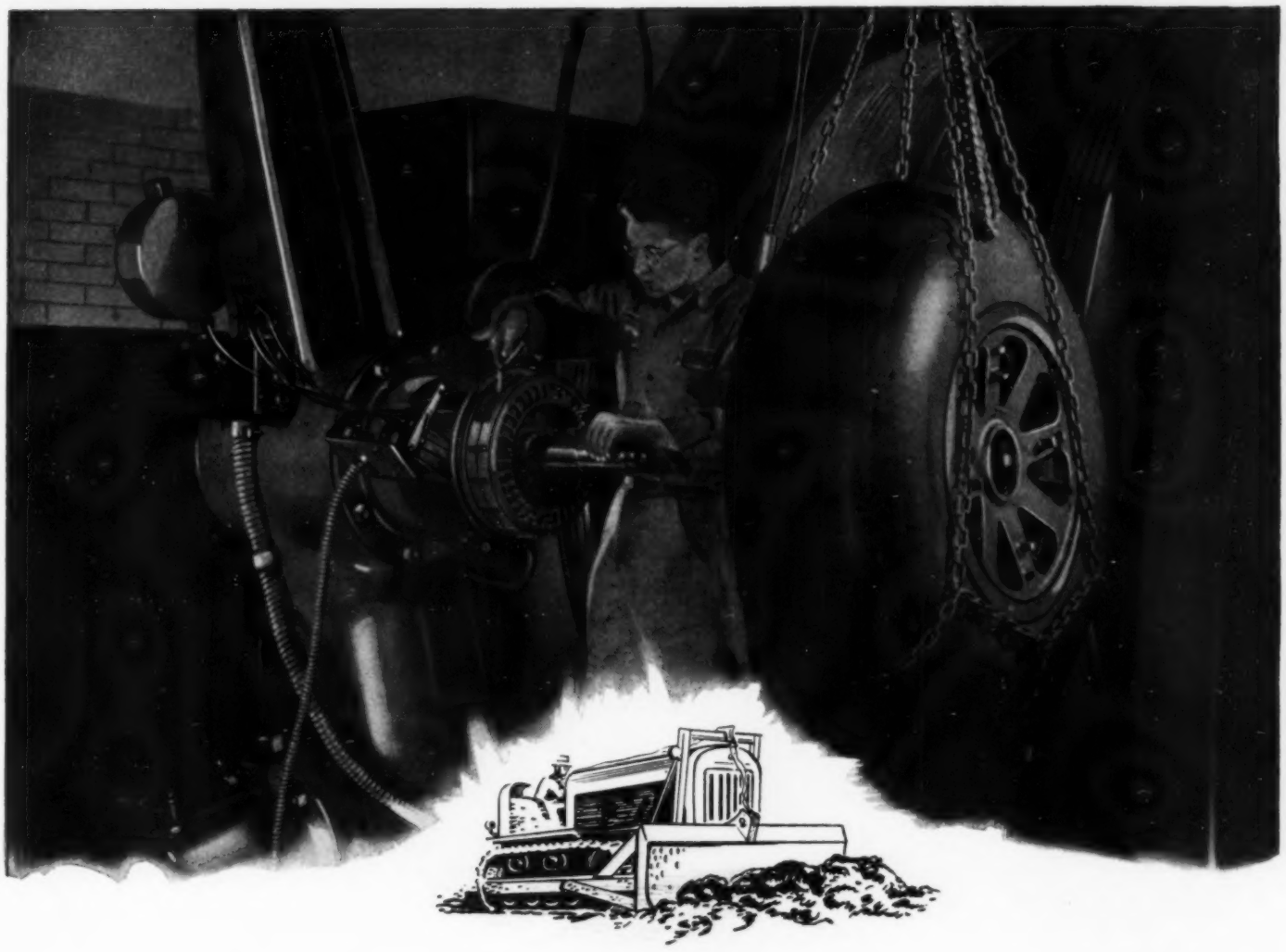
Distributors . . . a Huber franchise may be available in your territory. Why not drop us a line?

W. F. Ehrick

Plant Manager

THE HUBER MFG. COMPANY • MARION, OHIO, U.S.A.

3 WHEEL ROLLERS • TANDEM ROLLERS
MAINTAINERS • BULLDOZERS
SPEED-SCOOPS • SWEEPERS
HIGHWAY MOWERS • SNOW PLOWS

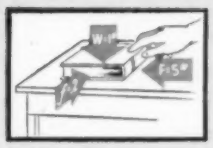


Back of every Velvetouch·Installation . . .

Behind each Velvetouch clutch facing and brake lining are years of leadership in developing powdered metal friction materials . . . plus the facilities of a well equipped laboratory devoted exclusively to the study of pairs of *rubbing surfaces.* Modern science and engineering skill can produce no finer friction materials than Velvetouch for brake and clutch replacements in tractors, power shovels and other earth-moving equipment.

THE S. K. WELLMAN COMPANY
1374 EAST 51st STREET • CLEVELAND 3, OHIO

Interesting facts about *Friction*



The coefficient of friction (f) of a book sliding across a table top is easily determined by dividing the weight of the book (W) by the amount of force required to slide the book (F).

Because many factors affect the coefficient of friction, i.e. speed, pressure, temperature, etc., it is impossible for any material to have a uniform coefficient of friction under all operating conditions.

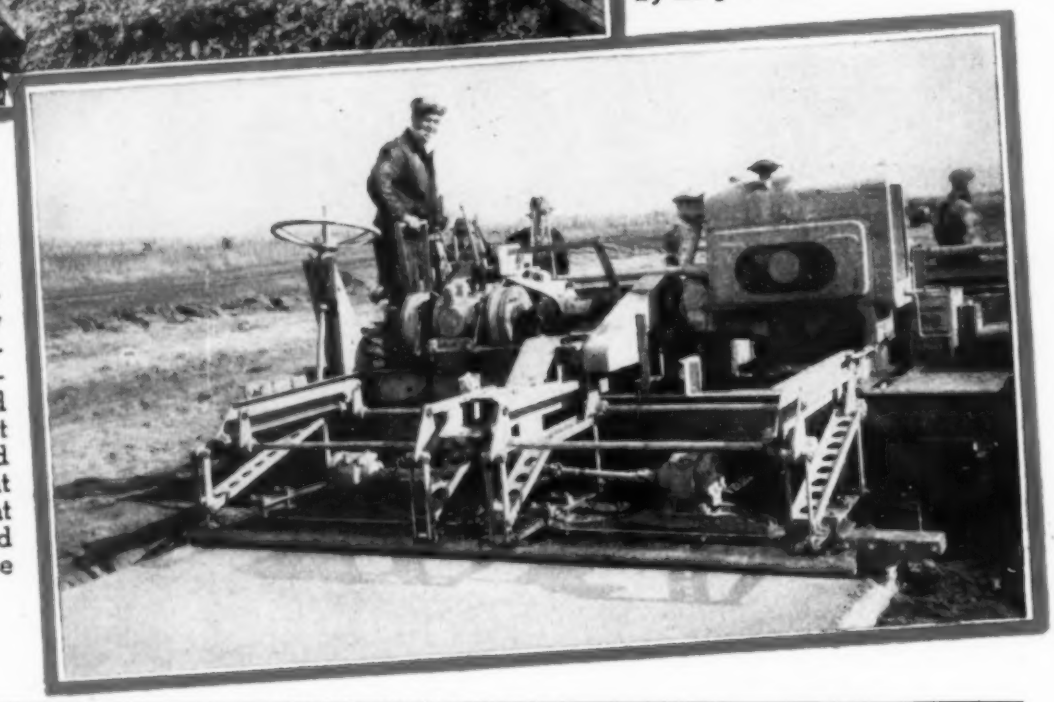
The powdered metals in Velvetouch are combined in a wide variety of "mixes" to give the best possible coefficients of friction for each installation.

For Brake and Clutch . . . Use Velvetouch

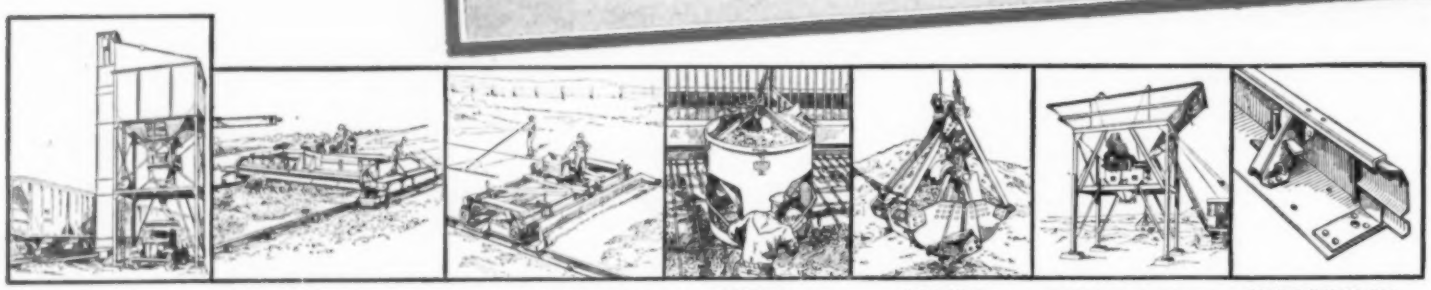
Velvetouch is *all metal* — a combination of powdered metals, compressed, sintered and welded to a solid steel backing.

Use this up-to-date

Dry, harsh, concrete paving mix being handled by Blaw-Knox Transverse-Blade Automatic Type Concrete Paving Spreader equipped with vibratory attachment. Concrete tested ½ to ¾ inch slump. Contractor's production in spite of difficult concrete was in excess of 400 lineal ft. of 12 ft. wide slab 9" thick per hour. Spreader-Vibrator is one man operated. Vibration increased strength of concrete by 25 per cent.



View behind Blaw-Knox Spreader-Vibrator shown in upper photograph. Concrete has been spread to required elevation and simultaneously compacted by vibratory attachment. Note uniformly smooth surface behind vibrator. Blaw-Knox Finishing Machine worked closely behind Spreader-Vibrator and kept pace easily. Cores drilled from completed pavement showed no honeycomb at bottom of slab or at joints and no excess mortar at surface of pavement.



BULK CEMENT PLANTS | PAVING SPREADERS FOR AIRPORTS AND ROADS | FINISHING MACHINES FOR AIRPORTS AND ROADS | CONCRETE BUCKETS | CLAMSHELL BUCKETS | AGGREGATE BATCHING PLANTS | PAVING FORMS FOR AIRPORTS AND ROADS

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Los Angeles, Cal. — E. M. Ornitz
San Francisco, Cal. — C. H. Grant Co.

paving method

FOR GREATER PRODUCTION, LOWER COST AND HIGHER QUALITY

1. **Automatic Transverse Spreading Blade** spreads concrete transversely and at the same time pushes excess concrete ahead of machine; adjustable for spreading height.
2. Strike-off shapes concrete to required height and crown allowing slight excess for compaction by vibrator; strike-off is hydraulically adjustable for elevation.
3. Vibratory attachment compacts concrete simultaneously with spreading operation; vibrator is spring suspended and does not rest on side forms. All vibratory effect is transmitted directly to the concrete. Vibrator is controlled by spreader operator and leaves slight excess of concrete for finishing machine.
4. Finishing Machine front screed strikes off excess of concrete to exact grade and crown. Finisher has easy and rapid operation; follows close behind Spreader-Vibrator.
5. Rear screed of Finishing Machine performs final finishing and smoothing operation.

The method of paving construction illustrated has been proved on hundreds of miles of concrete paving construction for roads and airports.

The dry and harsh concrete mixes frequently specified by engineers for modern pavements can be spread, compacted and surfaced most rapidly and efficiently by the combination of the Blaw-Knox Transverse-Blade Type Automatic Concrete Paving Spreader equipped with vibratory attachment and the modern Blaw-Knox Finishing Machine.

The Spreader-Vibrator spreads the concrete to the required depth and at the same time compacts the concrete by vibration. The Finishing Machine follows close on the heels of the Spreader-Vibrator and does a quick and easy surfacing job. The Blaw-Knox Spreader-Vibrator teamed with the Blaw-Knox Finishing Machine handles the output of two 34-E dual drum paving mixers.

Difficult concrete is easily handled on a production basis by this up-to-date paving method and the contractor gains — in greater yardage, lower construction cost, minimum of manual operations and higher quality paving.

The Blaw-Knox Finishing Machine can also be equipped with a vibratory attachment. However, experience has shown that the paving vibrator mounted on the spreader provides better compaction, more practical operating procedure, and maximum production of paving slab. The Spreader-Vibrator always remains with the paving mixer and does not have to move back to aid in correction of high or low areas.

Blaw-Knox Spreaders and Finishers including vibratory attachments are available in standard sizes as follows: 10-15 ft. adjustable width, 20-25 ft. adjustable width.

Your Nearest Blaw-Knox Distributor Will Promptly and Efficiently Handle Your Inquiries for Construction Equipment.

BLAW-KNOX

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2086 Farmers Bank Bldg., Pittsburgh, Pa.
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ARMY E NAVY

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WHERE TIME WAS WORTH MORE THAN GOLD

Back in 1941 Wooldridge Scrapers started working on a 24 hour a day schedule in Alaska leveling the ground for CAA Airports. It was from these advanced landing fields that American planes took off in June of 1942 to repel the Jap invasion, thus saving Alaska and the Aleutians. At the same time, Wooldridge heavy duty earthmoving equipment was blazing a trail overland which was to become the Alaskan Highway. Wooldridge Bulldozers mowed down trees, moved rocks, cleared fallen timber and led the way through rough and rugged country. Following in their wake were 17-yard Wooldridge Scrapers carrying fuel oil, supplies and parts to advance camps where they began moving worlds of earth around the clock in their race against time. Here again Wooldridge Scrapers maintained their established reputation for heaping yardage loads, trip after trip—day after day, with less wear and less down time for repair. Write today for details on Wooldridge Earthmoving Equipment.

WOOLDRIDGE

MANUFACTURING COMPANY • SUNNYVALE, CALIFORNIA

SCRAPERS • POWER UNITS • BULLDOZERS • RIPPERS • TRAIL BUILDERS

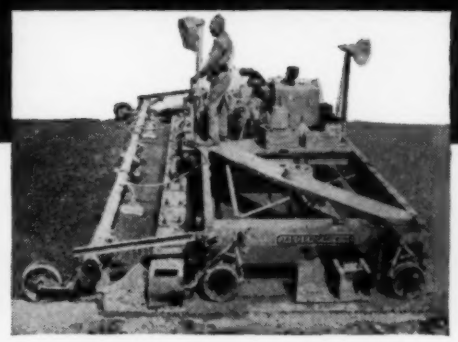
Top view shows Wooldridge Terra Clipper Scraper working for Utah Construction Co. on Alaska Highway in the Western Yukon.

★

Bottom view shows Wooldridge heavy duty Scraper on the Alaska Highway just west of White Horse. Govan & Adler, Contractors.

BOILING BOWL TERRA CLIPPER PRINCIPLE SCRAPERS

LOOK AHEAD WHEN YOU PLAN PAVING— Today's Jaeger Methods Meet Tomorrow's Specifications



1 CONCRETE RE-MIXED ON THE SUBGRADE by compacting spreader screw

Comparative tests by highway engineers of various States have proved conclusively that the Jaeger method of screw-spreading concrete produces a more uniform, denser and, therefore, longer wearing slab.

By its thoro and positive re-mixing and inter-mixing of piles dumped on the subgrade, both the segregation of coarse aggregates in the batch and the variations between different paver batches are eliminated; badly placed batches are redistributed to leave a uniform spread of material ahead of the Finishing Machine, with material placed so solidly against the road base and side forms as to eliminate the honeycomb problem and the entire mass compacted to weight and density approaching that of vibrated concrete.

As one prominent engineer states: *"It has been demonstrated that the quality of concrete can be improved and at the same time cost of production to the contractor can be reduced."*

It is logical to expect that re-mixing on the subgrade will be specified by Highway Depts. to insure higher strength, longer life pavements.

2 VIBRATION ON THE FINISHER, not on the concrete spreader.

Although Jaeger can furnish a vibratory attachment for use on Spreaders, the recommended Jaeger method of *vibration on the Finisher* has proved superior for any true vibratory mix. On an efficiently run job, only the Finisher has time to go back for more than one vibratory pass, as often needed. Also, it is the machine which always finishes to form level, thus insuring an over-all vibrated surface.

To meet future specifications we recommend the Jaeger Vibratory Finisher with "bullnose" screed giving DEEP INTERNAL VIBRATION or, where conditions suit, use of a vibratory tube *on the Finisher.*

3 FAST MECHANIZED HANDLING for quick-drying air-entraining cements.

The Spreader-Finisher "team," originated by Jaeger, which made it possible to handle stiff, vibratory concrete at the dual-drum paver pace, also equips road builders to handle quick-drying air-entraining cements. Under hot, windy or dry air conditions the Jaeger "team" has the spreading and finishing capacity needed to keep close behind big pavers and complete the job before drying hinders a satisfactory finish. Also Jaeger, alone, has the independent, fast screed speeds often needed to prevent tearing of the sticky surface.

For further information, ask your Jaeger distributor or write us for contractors' and engineers' reports.

The Jaeger Machine Co., 800 Dublin Ave., Columbus 16, Ohio

JAEGER *Engineered* EQUIPMENT

"Sure Prime" Pumps, "SpeedLine" Mixers, "Air Plus" Compressors, "Fleet-Foot" Loaders, Jaeger Hoists, Spreaders and Finishers

Which of these Wire Ropes Would You Use?

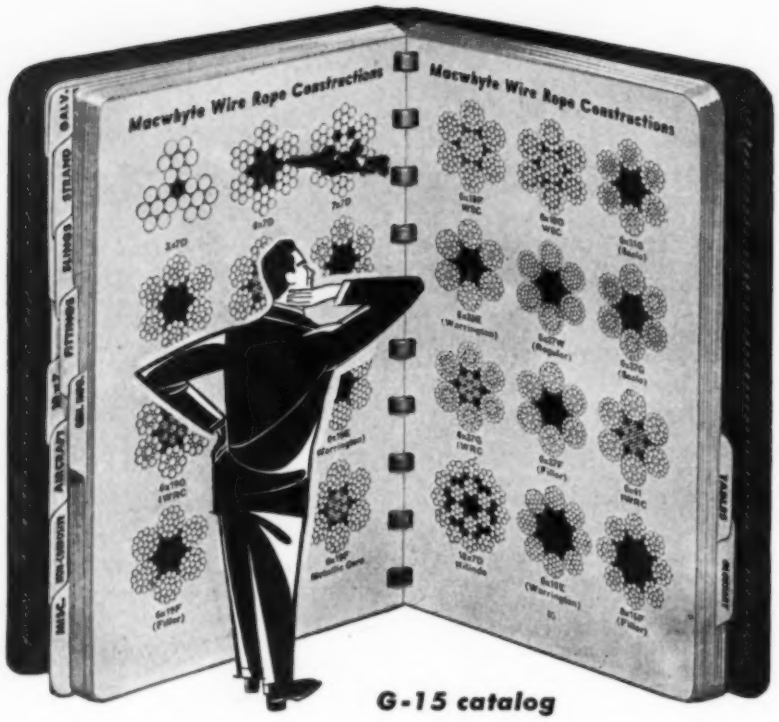
Years ago wire rope was not the highly specialized product it is today, nor was there as much use for wire rope or so many *different* uses.

Because of the many kinds of equipment using wire rope, plus the many and varied applications of that equipment, many sizes, grades, and constructions of wire rope must be made.

This makes it difficult for wire rope users to select the correct rope.

If the equipment is used in the normal way under average conditions, the manufacturer of the equipment can and does offer suggestions as to the type of rope they believe is best.

But should the equipment be altered to suit special needs, or should conditions not be average, a different wire rope specification is usually necessary for the best service.



G-15 catalog

• *Many Factors Considered*

In recommending the correct wire rope for your equipment, several factors need to be considered:

1. Safety Factor—This has to do with the amount of loading and whether it is steady or a shock load.

2. Bending Fatigue—This has to do with the number and size of sheaves, size of drum, and also speed of rope.

3. Abrasion.

4. Type of Equipment:

5. Use of Equipment.

Conditions of service on a given type of equipment vary so much that it is often helpful to know the type of rope previously used and the service it gave.

Then after a study of this information, wire rope can be recommended that experience proves will give the best service.

Sounds difficult, doesn't it? Really it isn't difficult when you have the advice and counsel of Macwhyte Wire Rope Engineers. Just write to Macwhyte Company, its distributors or mill depots. Tell them the make and model number of your equipment, explain briefly what it is being used for, and mention the size, grade, and construction of the rope you are now using.

Remember — Macwhyte makes the "Correct Wire Rope For Your Equipment."

Pictured above are but a few of the types of wire rope made by Macwhyte so that you may have the "Correct Rope For Your Equipment." There is a size, grade, and construction of Macwhyte Wire Rope that will give you low cost, safe service.

MACWHYTE PREformed WIRE ROPE Plus Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

NO. 707

MACWHYTE COMPANY

Wire Rope Manufacturers

ARMY E NAVY

2941 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope · MONARCH WHYTE STRAND Wire Rope · MACWHYTE Special Traction Elevator Rope · MACWHYTE Braided Wire Rope Slings · MACWHYTE Aircraft Cables and Tie-Rods · MACWHYTE Stainless Steel Wire Rope · MACWHYTE Monel Metal Wire Rope

THE *Right* MODEL FOR *Every* PAVING BREAKER JOB!

CLEVELAND C11

This 58-lb. tool has a long stroke and strikes a very heavy blow. It is noted for its economical air consumption.

CLEVELAND C9

Weighs 82 lbs., and is a slugger suitable for reinforced, well-seasoned concrete. A No. 85 compressor operates two.

CLEVELAND C7

This 80-lb. model is best for all around work on paving breaking and demolition jobs. Two C7's run from a No. 85 compressor.

CLEVELAND C10

This is a smaller (35-lb.) model for light work, trimming, etc. Three C10's run from a No. 85 compressor.

CLEVALOY CHISELS, MOILS, TOOLS

Moil Chisel | Narrow Chisel | Wide Blade | Digging Driver | Sheeting Bar | 7/8" Tamper Bar | 5" Tamper Bar | Clay Blade | Clay Spade | Asphalt Cutter

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Write for Bulletin 128

THE CLEVELAND ROCK DRILL CO.

Division of The Cleveland Pneumatic Tool Co. • CLEVELAND 5, OHIO

BRANCH OFFICES: Birmingham, Ala.; Boston, Mass.; Buffalo, N. Y.; Butte, Mont.; Chicago, Ill.; Cincinnati, O.; Dallas, Texas; Denver, Colo.; Detroit, Mich.; El Paso, Texas; Ironwood, Mich.; Lexington, Ky.; Los Angeles, Calif.; Milwaukee, Wis.; New York, N. Y.; Philadelphia, Pa.; Pittsburgh, Pa.; Richmond, Va.; Salt Lake City, Utah; San Francisco, Calif.; St. Louis, Mo.; Wallace, Idaho; Washington, D. C.

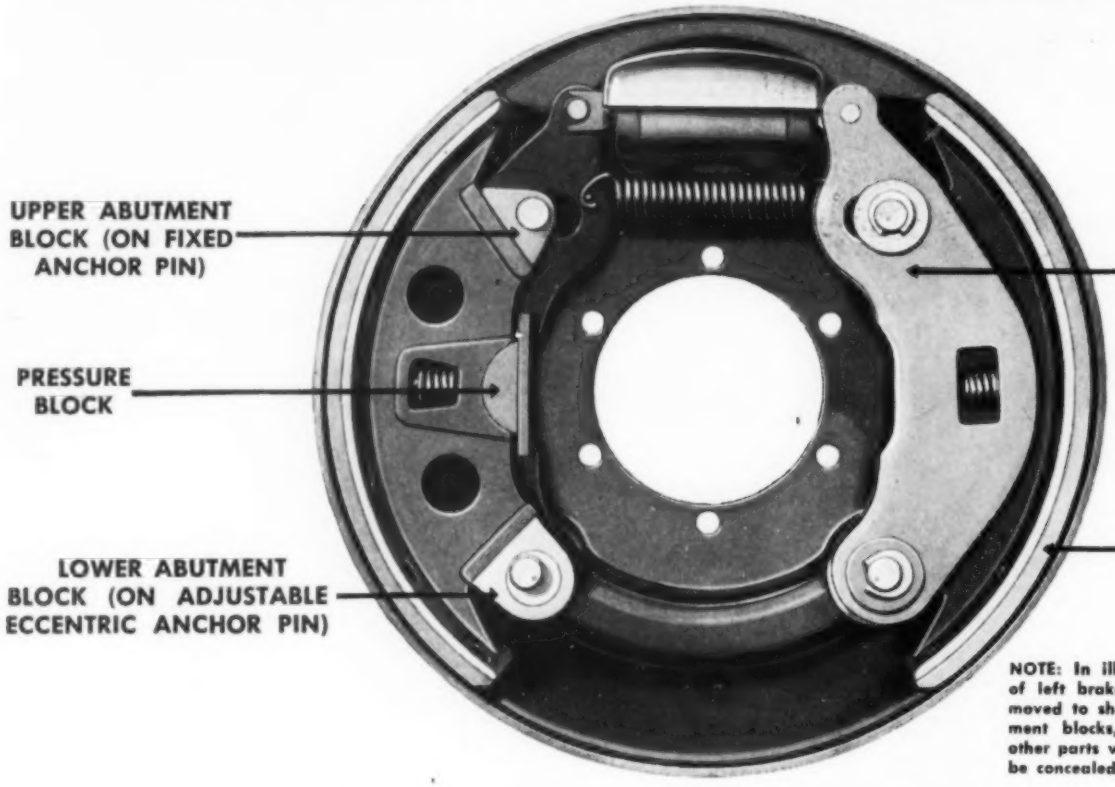
Canadian Distributors: Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C.

The new

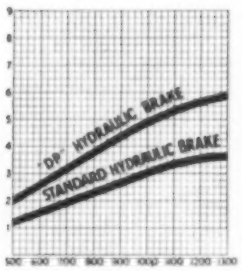
TIMKEN "DP" BRAKE

DUAL PRIMARY

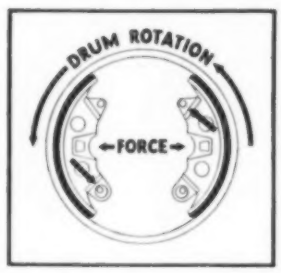
medium duty series for hydraulic actuation

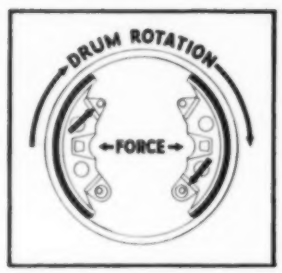


NOTE: In illustration above, half of left brake lever has been removed to show brake shoe, abutment blocks, pressure block and other parts which otherwise would be concealed from view.

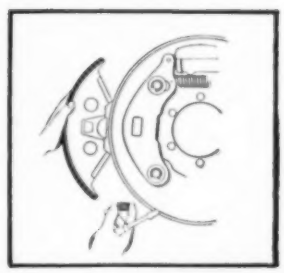


30% to 35% greater braking ability at all hydraulic line pressures.





Both shoes are equally self-energizing, regardless of direction of drum rotation.



Shoes can be removed in a few seconds, with just a screwdriver.

Greater braking ability . . . longer liner life . . . complete driver control . . . utmost simplicity . . . equal effectiveness in forward or reverse . . . these and other features of the new Timken "DP" Brakes fully meet today's needs for the improved brake performance demanded by heavier loads and faster schedules.

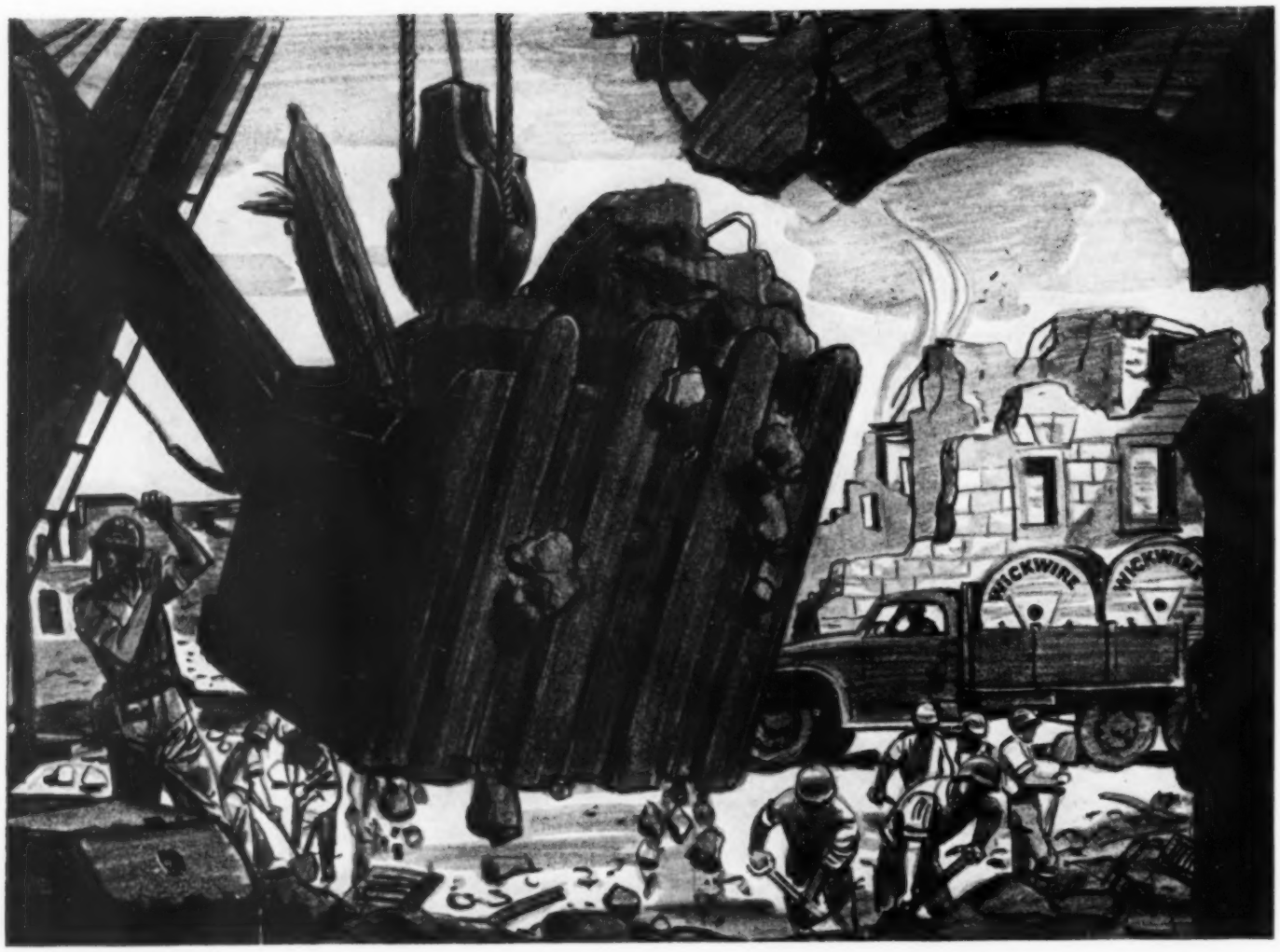
Timken "DP" Brakes are available now on certain vehicles being produced in 1944. Write for descriptive folder — see how perfectly these modern brakes meet YOUR needs!

38 YEARS OF AXLE ENGINEERING LEADERSHIP

TIMKEN AXLES — The Accepted Standard — DA CO

TIMKEN AXLES

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT 32, MICHIGAN
WISCONSIN AXLE DIVISION • OSHKOSH, WISCONSIN



Friend of the "*Cleaner Uppers*"

As the invasion forces go forward shell-holes must be filled—tottering walls brought down and the rubble of destruction removed. And friendly, dependable Wickwire Rope is an old hand at helping the boys who clear the roads and keep supplies moving.

Long-lasting Wickwire Rope is a world traveller these days—as Liberty ship rigging, and in reels for our fighters who are doing the jobs that lead to victory. There are jobs here at home that are vital to success and they also call for strong wire rope. If you need Wickwire Rope it's available on priority, but it pays to make what you now have last as long as possible.

We will be happy to help you with your wire rope problems and also to send you copies of "Know Your Ropes" which offers helpful advice on proper selection, application and usage. Write Wickwire Spencer Steel Co., 500 Fifth Avenue, New York 18, N. Y.

TO AVOID SHOULDER WEAR

Exact alignment of sheaves is important. Our Free book "Know Your Ropes" tells why and shows how to do it. This and 39 other wire rope life savers; 78 "right and wrong" illustrations and 20 diagrams and charts are all contained in this 82 page book.

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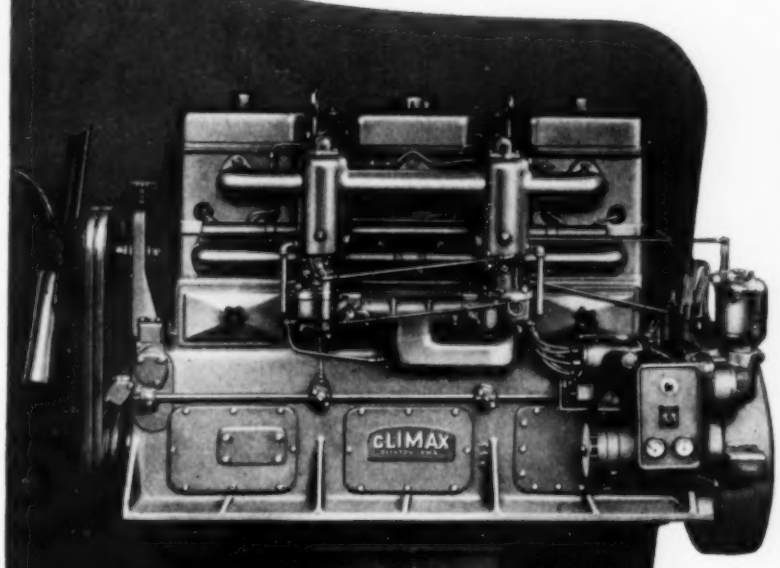
THE MODERN ENGINE FOR PUTTING INTO YOUR EQUIPMENT

Climax R6I



The Climax R6I, 6 cylinder, valve-in-head engine which develops 166 hp. at 1200 r.p.m.

Equipment builders, buyers and operators can be sure of tip-top performance by specifying a Climax power plant.

The Climax R6I shown at left is ruggedly built to stand abuse, yet accurately balanced to the last fine detail for smooth quiet running. The engine is conservatively rated to deliver 166 hp. at 1200 r.p.m. Fuel is no problem. The power may be obtained from natural gas, butane or gasoline.

Many time-tested superiorities and refinements are incorporated into all Climax power plants. The patented Blue Streak Combustion Chamber provides extra fast pick-up and reserve power to handle periodic overloads and hard going. The low piston speeds and moderate compression ratios reduce strain and wear on all operating parts, and promote longer life. The pressure lubrication and large cooling areas insure low, safe running temperatures in all climates.

The Climax R6I is suitable for direct, chain or belt connection to either stationary or portable machinery. For stationary work the power plant may be furnished for the required speed and rating, completely equipped with all required accessories. For portable service it is supplied with steel housing, radiator and fan, clutch, power take-off or other accessories.

This Cedarapids "Roadmix" made by Iowa Mfg. Co., and powered by a Climax Model R6I, is but one of the numberless profitable applications for this versatile power plant.

"For High Achievement in the Production of War Material"

Climax Engineering Company

GENERAL OFFICES & FACTORY:
CLINTON, IOWA

REGIONAL OFFICES: CHICAGO, ILL., DALLAS, TEXAS

AFFILIATED COMPANIES: McAlear Mfg. Co., Chicago; Hanlon-Waters Co., Tulsa

FOR COMPLETE INFORMATION WRITE CLIMAX ENGINEERING CO., 1807 SOUTH FOURTH ST., CLINTON, IOWA

ALSO WRITE FOR BULLETIN NO. S 327

This might have been your NEW shovel, but....

Your present equipment, working 'round-the-clock will last longer and continue to perform efficiently if these common-sense rules are followed:

- **insure proper regular lubrication.**
- **provide daily inspection to detect troubles while they are still small**
- **make adjustments when needed—don't wait**
- **tighten loose bolts and nuts**
- **keep fuel, lubricants and water clean**
- **remove clutch and brake bands and clean lining with good grade of clear gasoline**
- **change cables end-for-end to increase life of wire rope**
- **plan work to favor machine**
- **inspect engine regularly — flush radiator when dirty**
- **always give model and serial number when ordering repairs**
- **contact your BAY CITY distributor for parts and service.**

here again BAY CITY helps build airfields in the Solomon Islands

Throughout the Pacific theaters of operations the Seabees are making historic records in fighting and construction. Your new equipment—like this BAY CITY which is excavating coral deposit for an advanced airfield—has gone to war. And because there will be no new shovels or cranes released for civilian requirements until after the war is won, it is important that present equipment be kept in good operating condition. Observe the few simple, common-sense rules of maintenance. They will lengthen the life of your machine and help you keep going until new BAY CITY crawler or pneumatic tire mounted shovels, cranes or draglines are again available. In the meanwhile, we will be glad to send you catalogs and specifications so you will learn why BAY CITY offers such low-cost, dependable operation. Write Bay City Shovels, Inc., Bay City, Michigan.

BAY CITY SHOVELS
12 Sizes
⅜ to 1½ Yard
Also track mounted shovels and cranes

BAY CITY

SHOVELS • CRANES • DRAGLINES • TRENCH-HOES • SKIMMERS

"The Annapolis of the Merchant Marine"

A view of the Drill Hall. Interesting effects were obtained by using concrete units in several different sizes and colors, laid with irregularly staggered joints.

the U. S. MERCHANT MARINE ACADEMY

Beauty, permanence and rapid construction, in spite of wartime shortages of materials, have been achieved in the building of the U. S. Merchant Marine Academy, Kings Point, Long Island.

The buildings—18 in all—were designed by Alfred Hopkins and Associates, Architects and Engineers, and erected under the supervision of the War Shipping Administration. Some old buildings were also remodeled. The Vermilya Brown Company was the contractor. Masonry units were supplied by National Brick Corporation and ready-mix concrete by the Island Transit Mix Concrete Company.

A successful combination of concrete units and cast stone trim is seen in this entrance to the Drill Hall. All masonry units were made with Lehigh Early Strength Cement.

Much of the general construction work was done with Lehigh Normal Cement. Lehigh Early Strength Cement was used in the manufacture of approximately one million cinder concrete blocks and exterior colored concrete masonry units. By using this quick-curing cement in the manufacture of these blocks and units, the National Brick Company found that breakage was held to a minimum and blocks and units could be transferred to the high pressure steam chambers much more quickly, saving time and money.

For beautiful buildings . . .
built to last . . . with
speed and economy . . . use

LEHIGH EARLY STRENGTH CEMENT
for service strength in a hurry

Lehigh CEMENT

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

One-mile section of State Road No. 204, Duval County, Florida, leading to a naval air field. Designed by State Road Department of Florida, Division Office, Lake City. Contractor, Ivy H. Smith Company, Jacksonville.

Highway to naval air field completed quickly with Atlas High-Early Cement

FLORIDA State Highway Department specifications call for fourteen days curing time when normal portland cement is used; but this new highway had to be opened quickly to give access to a naval air field.

That is why Atlas High-Early cement was chosen, and this important mile-long stretch of road, built by Ivy H. Smith Company of Jacksonville, was opened three days after concrete was placed—a saving of eleven days.

When speed is needed in construction work, contractors know they can depend upon Atlas High-Early cement to save time and to help them meet or beat schedules.

Ask for your copy of "Case Histories of Days and Dollars"—the experience records of other jobs where Atlas High-Early has saved in time, money and equipment. Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

CHECK ON ATLAS HIGH-EARLY for Wartime Construction

Because Atlas High Early cement gains strength rapidly, produces serviceable concrete in one-third the usual time or less on some jobs, it—

1. ***Permits earlier use*** of concrete, and thus gives owner earlier occupancy.
2. ***Saves manpower*** when such conservation is needed most — releases men for new jobs more quickly.
3. ***Conserves lumber.*** Forms may be stripped sooner—sometimes in 24 hours instead of from 3 to 5 days—and re-used. Hence fewer sets of forms may be needed, saving time, labor and lumber.
4. ***Reduces overhead*** by saving time, manpower and equipment.

OFFICES: *New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Minneapolis, Duluth, Cleveland, St. Louis, Kansas City, Des Moines, Birmingham, Waco.*

SAVE TIME IN WARTIME WITH

Atlas High-Early Cement

A UNIVERSAL ATLAS PRODUCT

CM-H-

Big Jobs move faster with O-P-E-N C-E-N-T-E-R traction

Caterpillar Diesel DW-10 tractor with Goodyear Sure-Grip tires pulling LaPlant-Choate CW-10 scraper on Goodyear All-Weather Earth-Movers, moving heavy clay on airport job.

THE trend in earth moving is to bigger yardages — faster speeds — longer hauls. That calls for tires that won't gum up and spin under peak loads — tires with a sharp, clean grip that keep pulling.

Look at the O-P-E-N C-E-N-T-E-R *self-cleaning* tread of the Goodyear Sure-Grip pictured here, and you'll see why it is the greatest traction tread ever built.

It has no dead-end tread pockets, no mud traps to pack up solid. Dirt and stones sluice out, keeping the massive lugs sharp and keen for deep biting.

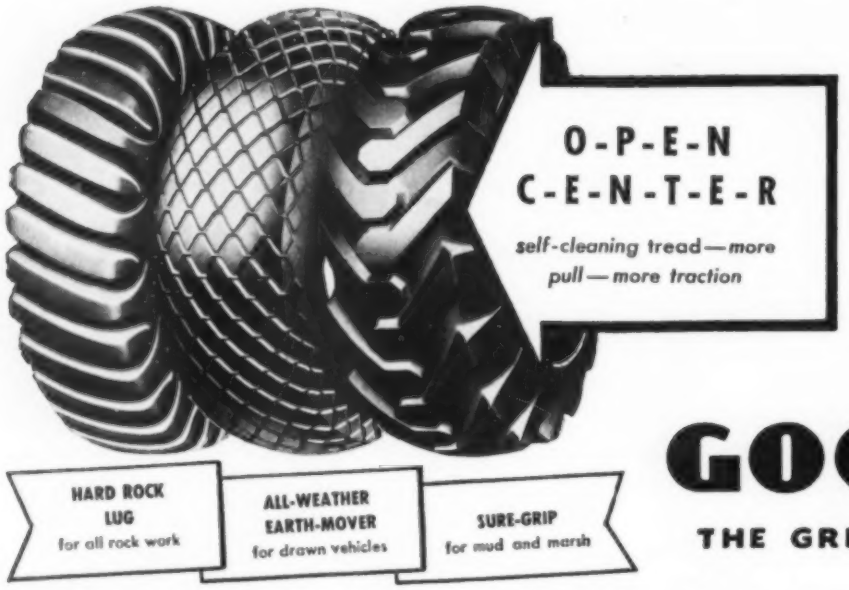
That's why you'll have less slip and spin with Goodyear Sure-Grips. They don't waste power; they keep you moving—on schedule.

This, combined with Goodyear's exclusive multiple-compounded construction and the extra strength of Goodyear's low stretch Supertwist cord carcass, gives you the sturdiest, toughest, most efficient tire ever built for big power units.

You can easily check on that. Just ask any contractor who has changed to Sure-Grips. He'll tell you Goodyears pull more, go faster and last longer. Why not see for yourself.

Sure-Grip, All-Weather Supertwist—T.M.'s
The Goodyear Tire & Rubber Company

THE RIGHT TIRE FOR EVERY JOB



BUY WAR BONDS—BUY FOR KEEPS

GOODYEAR

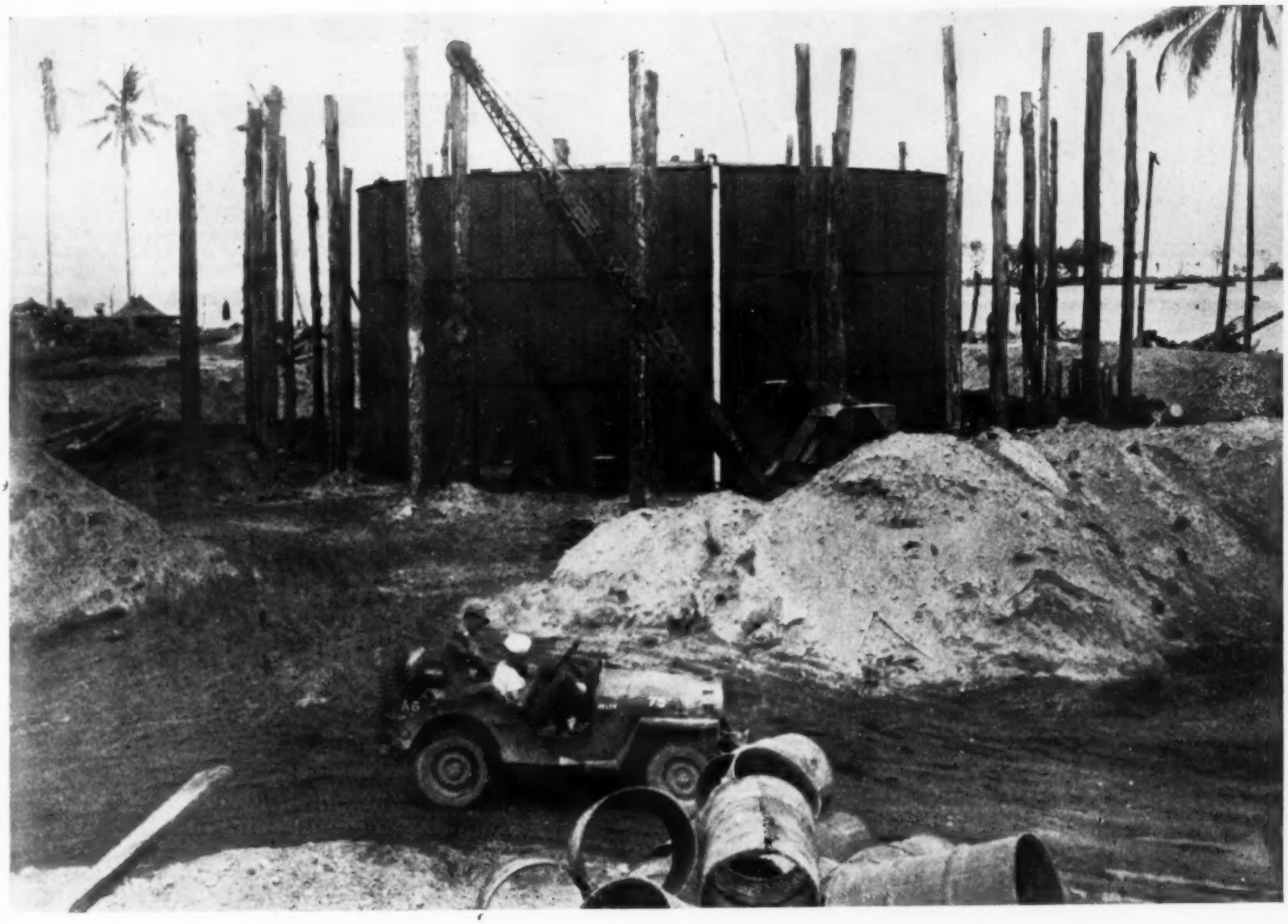
THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Construction Methods

ROBERT K. TOMLIN, Editor

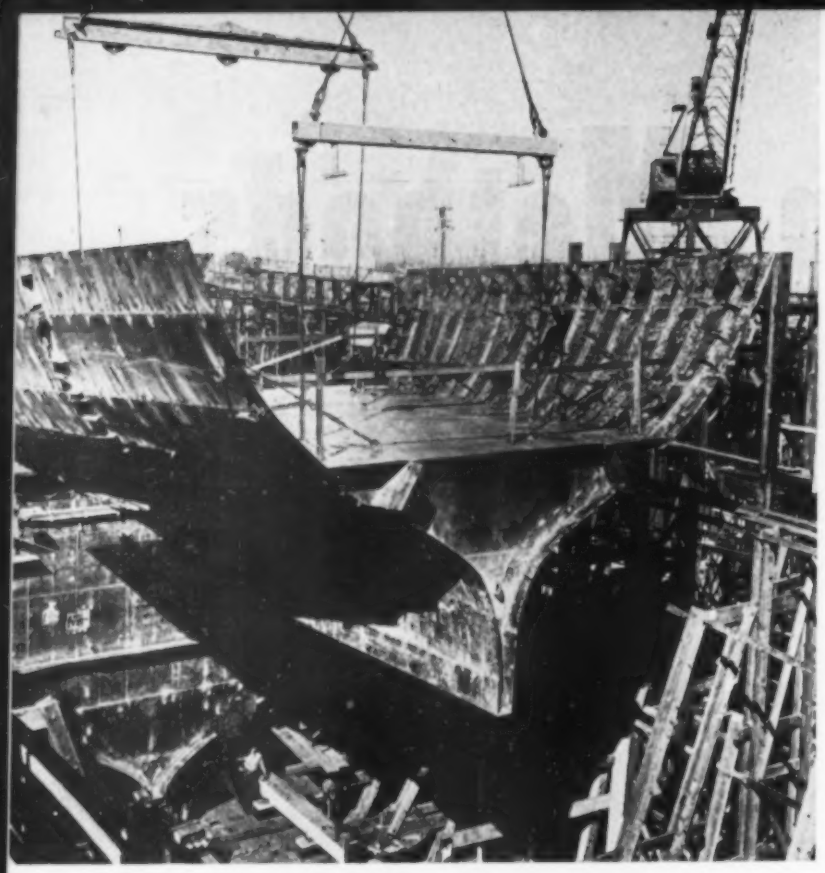
Volume 26 — AUGUST, 1944 — Number 8



SEABEES *Bombproof Oil Tanks* IN PACIFIC

IN THE METHODS adopted to protect 10,000-bbl. steel oil tanks against damage by Jap bombing in a Pacific war theater, the Navy's Seabees have again demonstrated their claim to the title of master improvisers under conditions of scarcity or entire lack of adequate equipment and materials. As illustrated in the accompanying photograph, obtained by Nathan A. Bowers, Pacific Coast editor of *Construction Methods,* who recently returned from a 28,000-mi. trip to South Pacific battlefronts as war correspondent accredited by the Navy Department, several concentric rings of cocoanut log piles, with poles in successive rings staggered, are driven to encircle the tank and extend well above its top. Over each pile is slipped a series of metal gasoline drums, with their ends knocked out (as seen in the foreground of the picture) to form a circular sheathing around each pile. The annular space between each wood pile and its improvised metal casing of gasoline drums is then filled up to the top with sand and gravel, forming an effective barrier—except in the case of a direct hit—against penetration of the steel plates of the oil tank by fragments of bombs exploding near the tank.

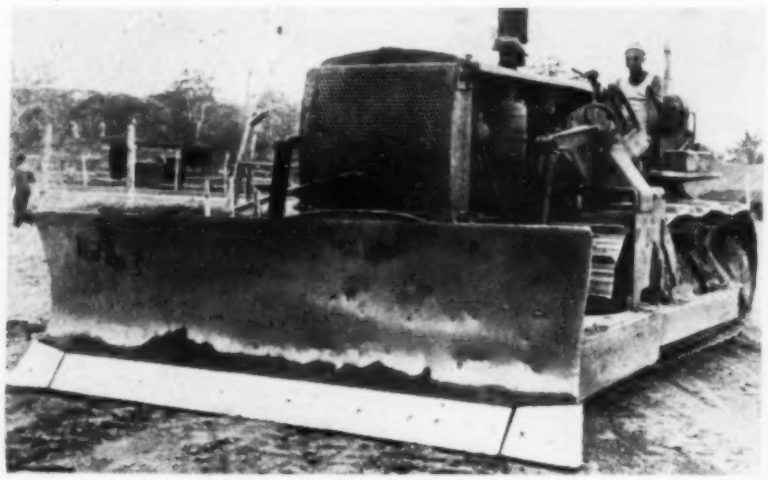
THIS MONTH'S NEWS REEL



SECTION OF HULL ASSEMBLY is swung into place on escort vessel under construction at Wilmington, Calif., yards of Consolidated Steel Corp.
U. S. Maritime Commission Photo

DENTED BY ENEMY SHRAPNEL is bulldozer blade of this D-8 Caterpillar tractor (below) which performed 1,000 hr. of continuous service, without repairs, for Navy's Seabees at Bougainville, Solomon Islands. In operator's seat in this view is Sergeant, first class, S. J. CHELLING, of Joliet, Ill. Battle-scarred machine is evidence that in this war construction equipment is fighting equipment.

"FLAIL" TANK is used for mine destruction in Normandy. Tank chassis is fitted with special anti-mine device which projects forward of tank with chains that whirl like flail as unit advances, exploding any mines in its path.
British Combine Photo



BAILEY BRIDGE (below) is erected by Royal Engineers in Italy. New British invention, this prefabricated bridge has greatly facilitated Allied advance in Italy and Normandy. British Combine Photo

GERMAN COASTAL DEFENSES (below) are pushed into sea by bulldozer as Allies clear up French fishing port in Normandy.
British Combine Photo

FIRST WATER flows into Madera Canal from Millerton Lake en route to irrigate land in Madera County, Calif. Nearly 3,000 persons attended opening ceremonies at Friant Dam, at which **CHARLES E. CAREY** (right), regional director, U. S. Bureau of Reclamation, discussed benefits of huge Central Valley project.

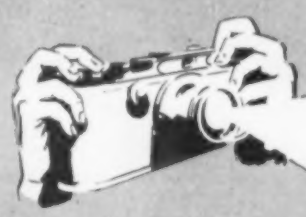
STRONG INTERSERVICE BOND has developed in Pacific war theaters between Navy's Construction Battalions (Seabees) and U. S. Marine Corps. Evidence of mutual esteem is supplied by this road sign dedicating "Marine Drive," highway newly built by Seabees, to "our very good friends, the Fighting Marines."

DAMAGED RAILS are removed from railway tracks near Cassino, as South African military engineers clear road through devastated Italian town.

British Combine Photo

NIGERIAN NATIVES (below) swinging picks in rhythm, build U. S. Army Air Forces base in Africa for Air Transport Command.

Army Air Forces Photo



Palm Leaf Panels "Prefabricated" by Seabees to Roof Barracks In Pacific War Theaters

By NATHAN A. BOWERS

Pacific Coast Editor, Construction Methods

MAXIMUM USE OF LOCAL MATERIALS to save demands on shipping space in cargo carriers from the United States is a prime requisite of most of the construction done by the Navy's Seabees in Pacific theaters of war. Usually one of the first jobs demanded on reaching a new base on some recently occupied island—after construction for battle purposes has been attended to—is to provide troop shelter. The accompanying photographs illustrate typical construction of living quarters for officers and men. These are wood frame structures, elevated a few feet above ground on bearing posts of cocoanut logs as a protection against torrential rains and mold from damp soil. They are thoroughly screened against mosquitos and other insect pests, and are thatched on roof and sides with "prefabricated" panels of the long, tough, water-resistant leaves of the ivory palm.

A common size of building serving as enlisted men's quarters is 20x80 ft. in plan; officers' quarters are of the same general type, but their length is only about one-half that of the men's

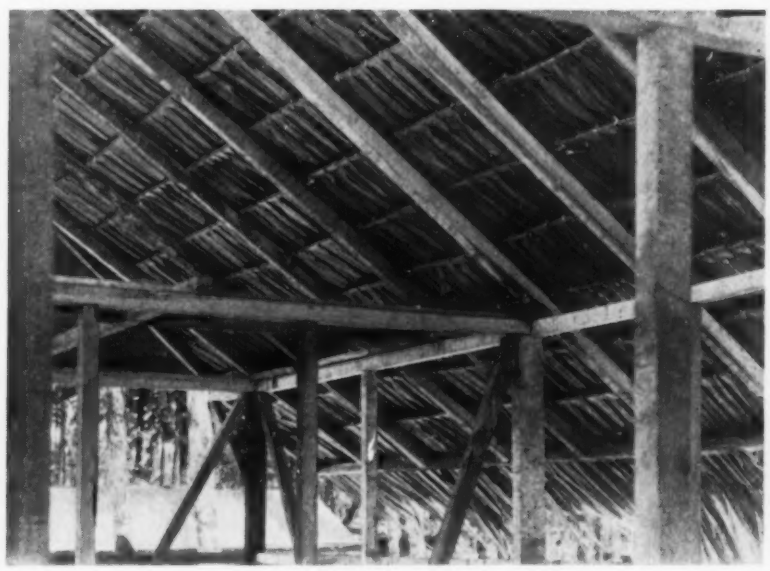
AS WAR CORRESPONDENT accredited by the Navy Department, **NATHAN A. BOWERS**, Pacific Coast Editor of "Construction Methods," obtained the photographs and notes on which the accompanying article is based. He is here shown in ruins of captured reinforced concrete Jap fortification in Pacific war theater. Dr. Bowers returned to United States recently from 28,000-mi. trip to various fighting fronts in Pacific.

COVERING OF ROOF AND SIDES of officers' quarters is of panels of palm leaves, applied like shingles. Screened ventilating opening extends as band around building under long overhang of eaves.

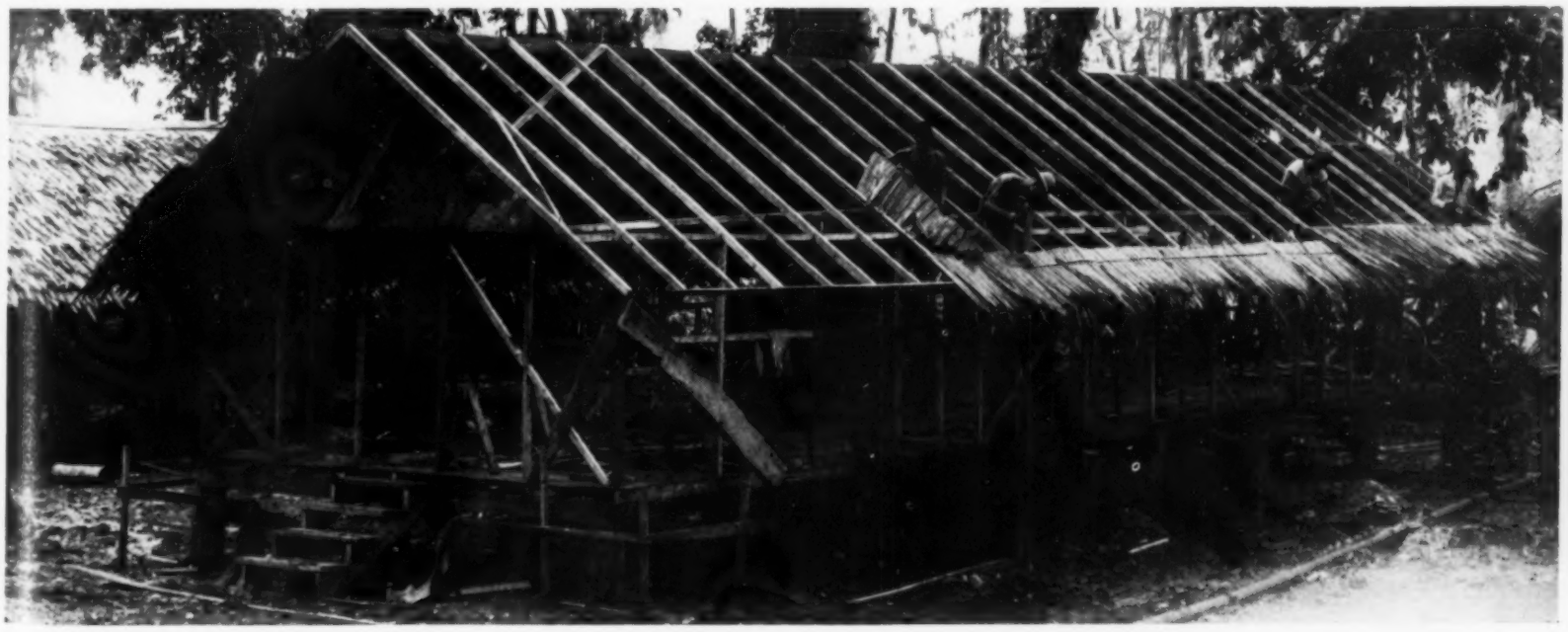
GREEN LEAVES OF IVORY PALM are folded over rods to form panels for thatching roofs of barracks. Here, section of steel pierced plank, designed for resurfacing airfield, is being used as fabricating table. In background is pile of completed thatching panels.

PALM LEAVES of roofing panels are stitched together with long, thin wood slivers.

ROOF IS "SHINGLED" with overlapping bands of palm leaf panels. Rods over which leaves are folded, like drapery on curtain pole, are attached to rafters by bending spikes over them.



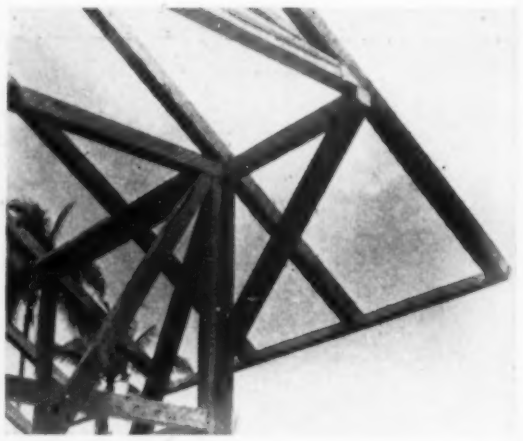
UNDERSIDE OF ROOF shows how palm leaf panels are overlapped, like shingles, to insure watertight covering.



ON RAFTERS OF SLOPING ROOF first band of palm leaf panels is applied along eaves. Succeeding panels will overlap, like shingles.

TYPICAL QUARTERS for men of military forces in Pacific areas are wood-frame barracks roofed and sheathed on sides with leaves of ivory palm, plentiful in some localities.

WOOD FRAMES, made of lumber obtained locally and processed by sawmills set up in field, are being erected for men's barracks, generally measuring 20x80 ft. in plan.



FRAMING DETAIL shows long overhang of rafters to shed water and form "eyebrow" shielding horizontal band of screened ventilation openings.

quarters. The framing is of the simplest type, comprising a gable or pitched roof with lower ends of rafters overhanging the walls more than the usual distance to shed water and form a canopy or "eyebrow" over the band of screened openings running continuously around the walls under the eaves. Side and end walls are formed by wood studs extending up from floor girders to top plates. The problem of lumber is always a critical one and in the absence of adequate supplies from the United States or elsewhere local hardwood—frequently teakwood, rosewood or mahogany—is processed at improvised sawmills for use as building material. In cutting wood of the exceptional hardness characteristic of the types available from local sources it is frequently necessary to play a stream of water on the circular saw blade to cool it.

By far the most unusual feature of the

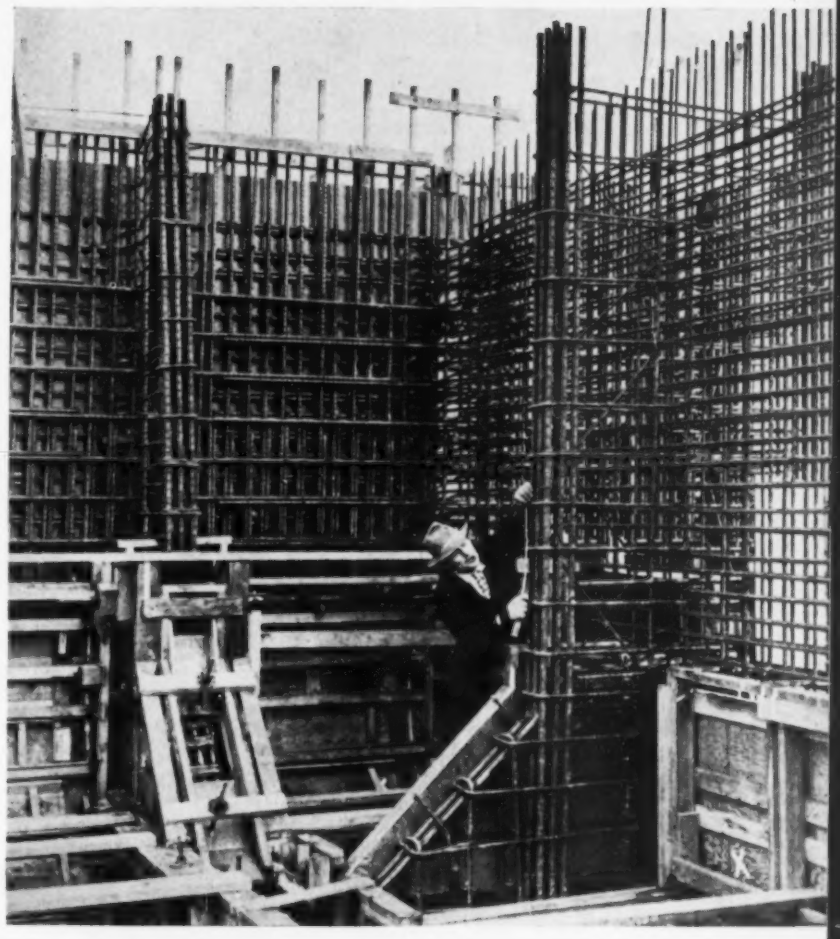
(*Continued on page* 142)

OFFICERS' QUARTERS (left) are smaller than enlisted men's barracks, but involve same type of wood frame construction. Note bearing posts of cocoanut logs to elevate floor above rain-soaked ground.

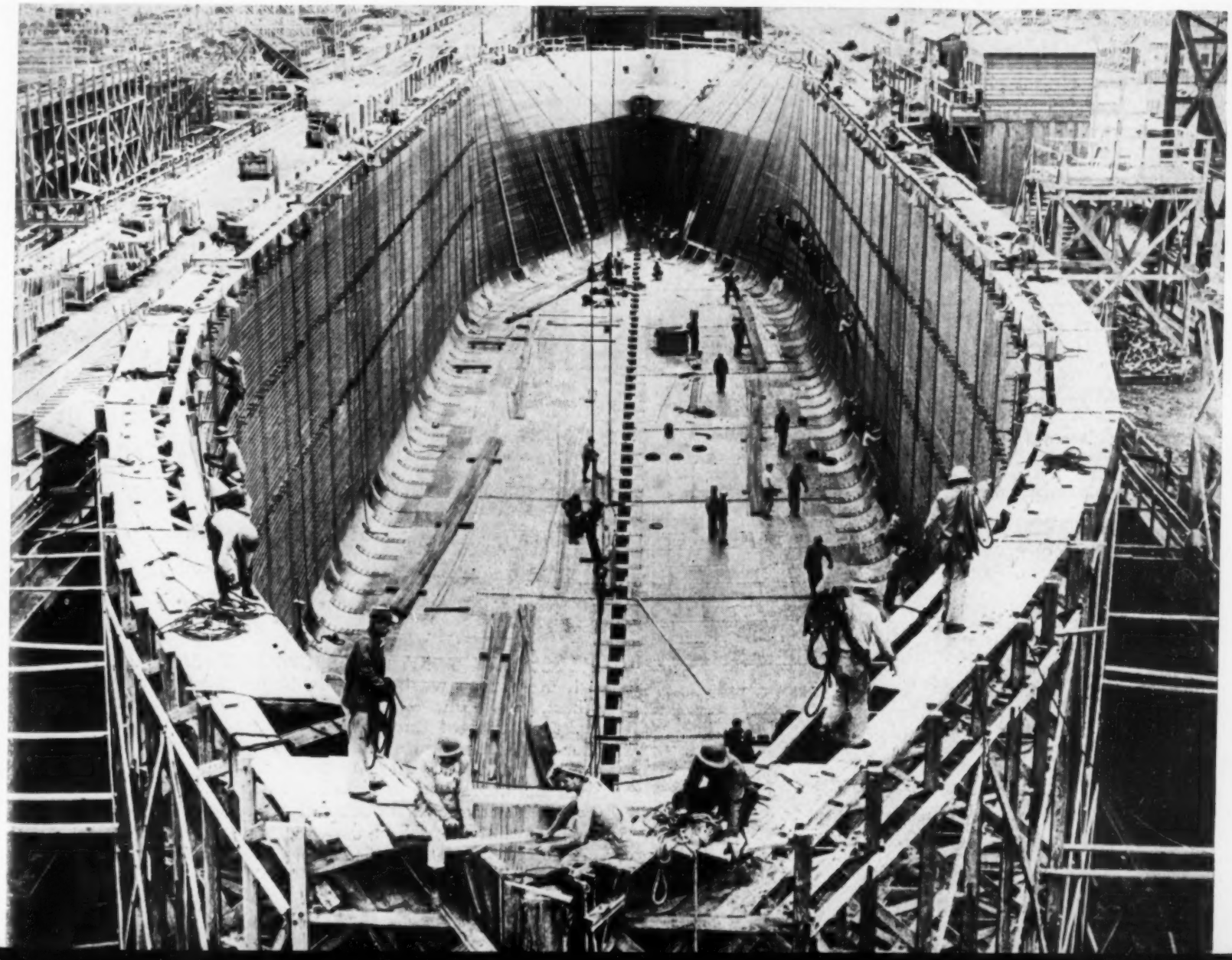
Seagoing Barges

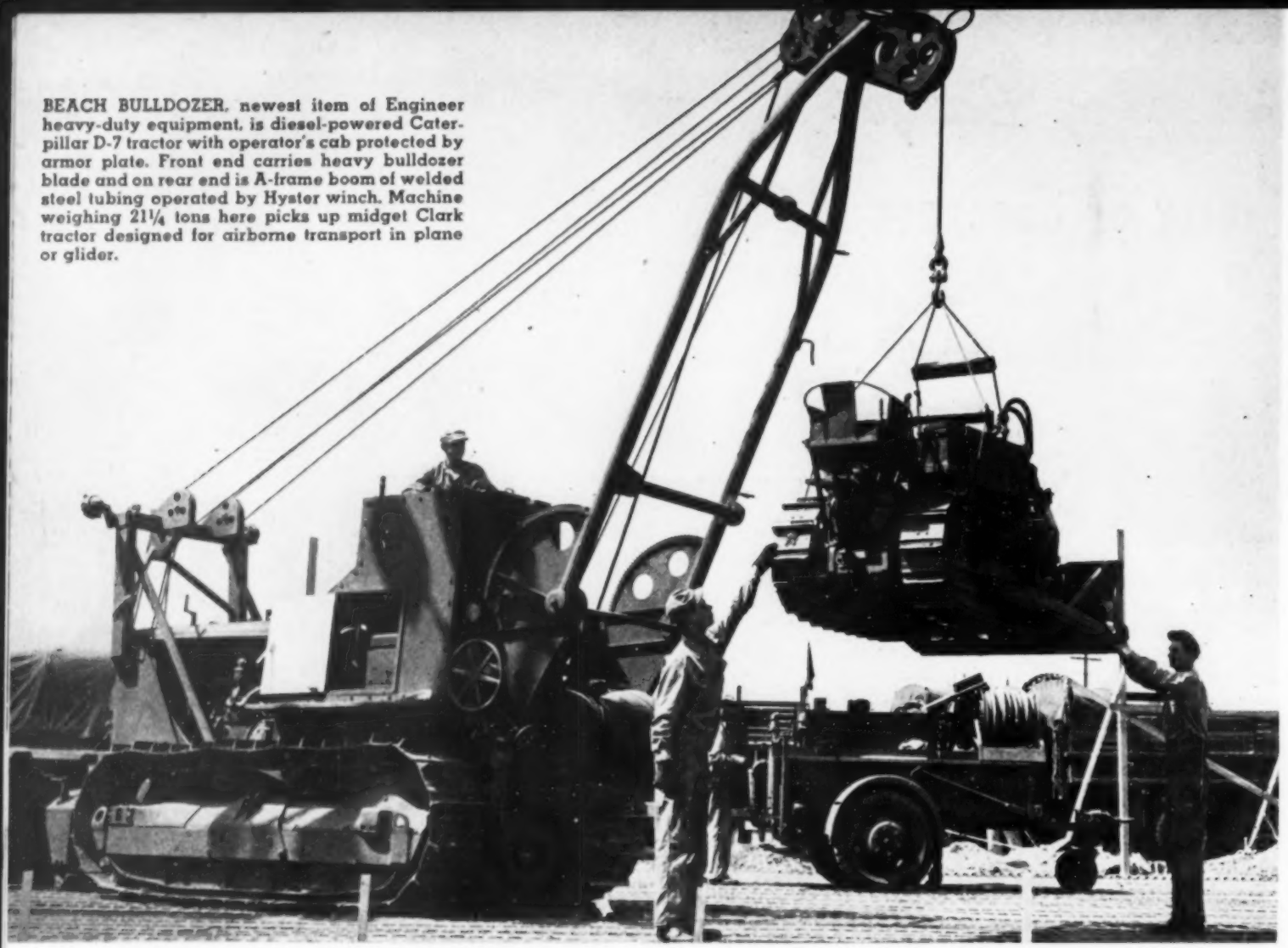
BUILT OF CONCRETE

SEAGOING BARGES of reinforced concrete are included in the U. S. Maritime Commission's large scale program of cargo vessel construction of various types. Herewith are views illustrating the form work and heavy steel reinforcement employed at a West Coast shipyard by Concrete Ship Constructors. The barges, of about 14,000 tons gross weight, are 360 ft. long, 56 ft. beam and 38 ft. depth. They are poured in three stages within plywood-lined forms. Exterior forms are built up to full height and interior forms are extended progressively as concrete pouring proceeds. Shell thickness varies from 5½ in. for the bottom of the hull to a minimum of 4½ in. for the sides. Lightweight aggregate is used for the concrete mix, which contains about 9½ sacks of cement per cu. yd. Steel bar reinforcement is welded into strings as long as 250 ft. and dragged into the hull through an opening at the bottom in the inshore end.



U. S. Maritime Commission Photos





BEACH BULLDOZER, newest item of Engineer heavy-duty equipment, is diesel-powered Caterpillar D-7 tractor with operator's cab protected by armor plate. Front end carries heavy bulldozer blade and on rear end is A-frame boom of welded steel tubing operated by Hyster winch. Machine weighing 21¼ tons here picks up midget Clark tractor designed for airborne transport in plane or glider.

Engineer Equipment

Is Feature of Weapons of War Exhibit

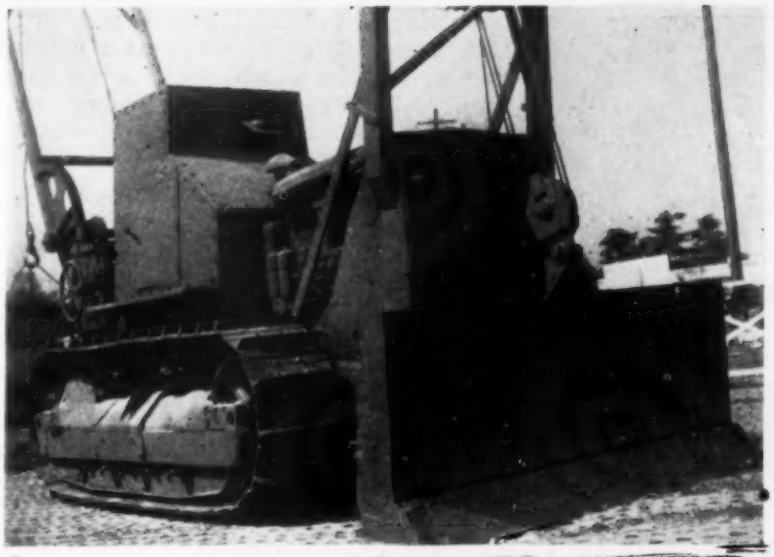
BY U. S. ARMY SERVICE FORCES

AIRBORNE TRACTOR (below) is midget Clark crawler unit with hydraulically controlled bulldozer blade used largely by Aviation Engineers for construction of advance airfields. It is here shown resting on pierced plank type of steel landing mat for airstrip surfacing.

By ROBERT K. TOMLIN

Editor, Construction Methods

ILLUSTRATING BY CONCRETE EXAMPLES the extent to which modern warfare is highly mobile and highly mechanized, an exhibit, "Weapons of War," featuring equipment used by the Corps of Engineers and other branches of the Army Service Forces, was staged on a 10-acre tract of Central Park in New York City June 11-24, during the period of the Fifth War Bond Drive, to indicate to the public some of the purposes for which its money is being spent to win the war. The Engineer exhibit covered equipment ranging in size from a pneumatic paving breaker to a new 21¼-ton, diesel-powered



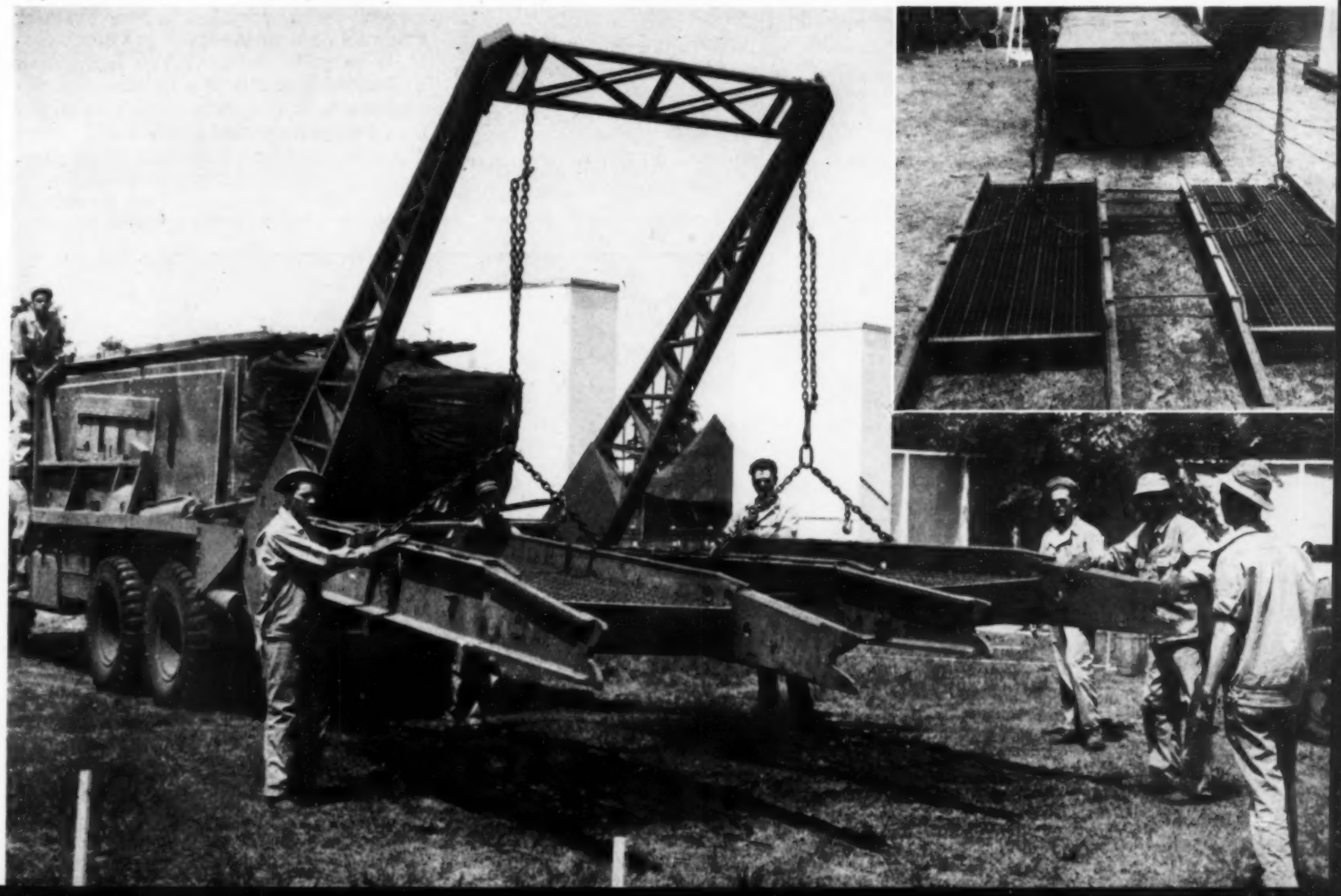
FRONT END of beach bulldozer is equipped with heavy bulldozer blade, cable-operated. As unit is designed for use in combat areas, operator is protected from enemy fire by armored cab.

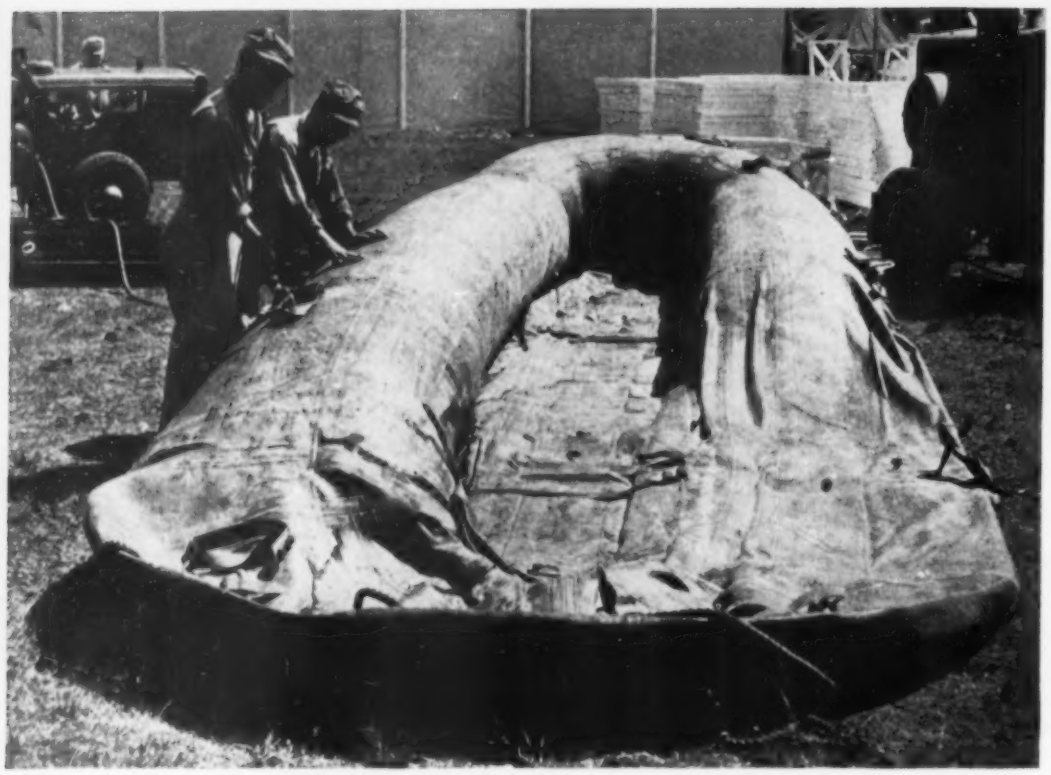
ARMORED CAB protects operator of new beach bulldozer, latest addition to Engineer equipment. Units of this type, here illustrated with a wood mock-up instead of the armor plate regularly used on the cab, because of the great demand for these protective coverings overseas, were used against the enemy for the first time after the invasion of Normandy beaches of France on D-day, June 6.

"beach tractor," designed for invasion service and fitted with an operator's cab protected by armor plate, a heavy bulldozer blade on the front end and a winch-operated A-frame boom of welded steel tubing on the rear end. Planned by the Engineer Board, Fort Belvoir, Va., the Engineer exhibit was presented under the sponsorship of the Engineer Department's North Atlantic Division and New York District Office, in charge, respectively, of Col. Albert H. Burton and Col. Edgar W. Garbisch.

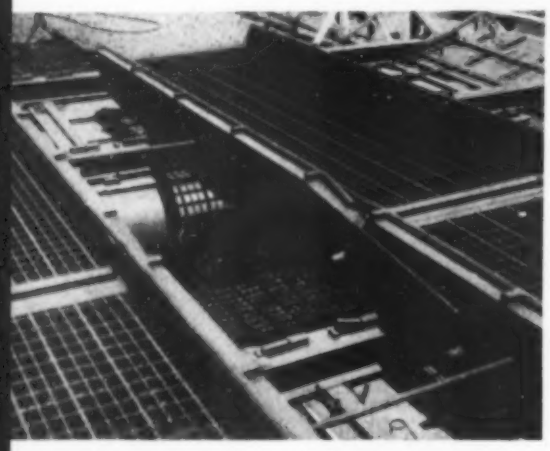
The present war has made greater demands upon Engineers and Engineer equipment than any other conflict in history. In addition to munitions and industrial plants, huge cantonments and training centers, airports, warehouses, shops and other large-scale projects in the United States, the Engineers have built off-shore bases, the Alaskan highway, airfields, oil pipelines and thousands ment used on those types of construction of miles of supply lines. The same equipis now in use overseas, often under enemy fire, to facilitate the operations and movements of Allied troops and to impede the movement of enemy units. With the invasion of Western Europe now a

STEEL GRID TREADWAY PANELS (below) to form roadway of floating bridge carried by air-inflated rubber pontons are picked up for placement by special Heil crane boom on 6-ton Brockway truck, designed to service Army Engineers' bridge-building operations.





SECTIONAL CONSTRUCTION is feature of air-inflated rubber pontons. Bulkheads form twelve independent cells, limiting escape of air when unit is perforated by enemy fire, so that buoyancy of undamaged sections enables bridge to remain afloat. Small compressor in background inflates rubber floats.



reality, instead of a hope, U. S. Army Engineers and their equipment are being called upon to provide airfields, bridges, roads, pipelines, docks and storage facilities. Theirs is the duty, also, of supplying maps to commanders of various Army units.

Among the units of Engineer equipment included in the exhibit were the following:

Map Reproduction—For map reproduction in the field the Engineers use a large, mobile truck-trailer unit carrying a complete printing press and accessory equipment designed for speedy production. The importance of maps in military operations is indicated by the fact that 3,500 tons of Engineer maps were delivered to General Eisenhower's command for planning the invasion of Europe and 69,602,000 copies of 3,132 separate maps were delivered for D-Day use.

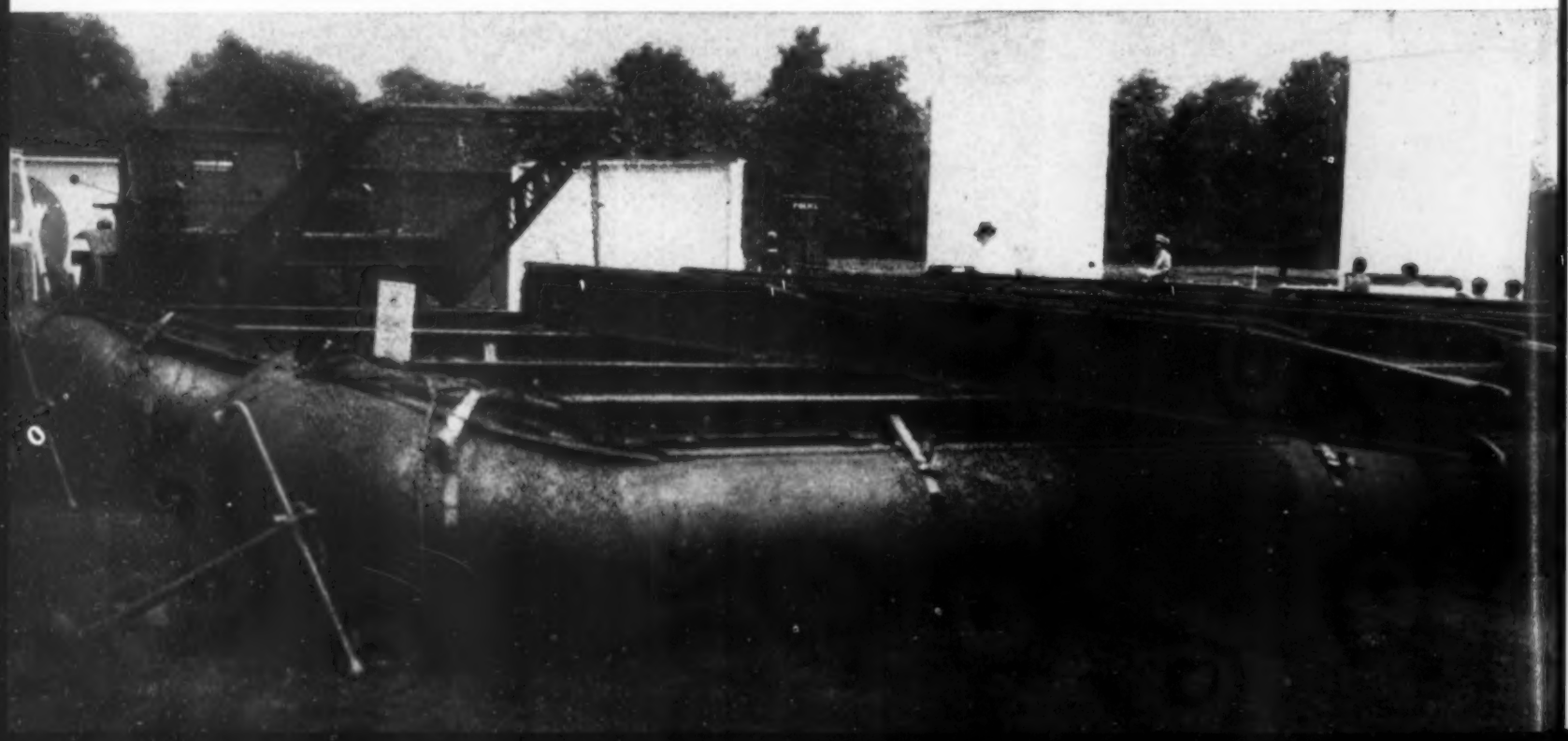
Beach Tractor-Bulldozer—Newest item of Engineer equipment is the "beach tractor" designed for use in connection with landing operations on hostile shores. Ordinarily it is the first item of heavy equipment to be landed in any amphibious operation. It is a Caterpillar D-7 diesel unit fitted with an operator's cab protected by armor plate, as indicated in one of the photographs, for combat duty. With accessories in the form of a heavy bulldozer blade on the front end and a welded steel tube A-frame boom on the rear, the unit weighs 21¼ tons. The boom, for lifting heavy objects and clearing a beachhead of war debris, is served by a power takeoff operating a Hyster winch.

Midget Airborne Tractor—In contrast with the heavy beach tractor is the midget Clark tractor, designed especially for airborne transport and use by the Army's Aviation Engineers. It is fitted with a hydraulically controlled bulldozer blade and may be readily loaded into a standard C-47 or C-46 transport plane or a transport glider. It is largely used for grading the sites of airplane landing strips at advanced locations.

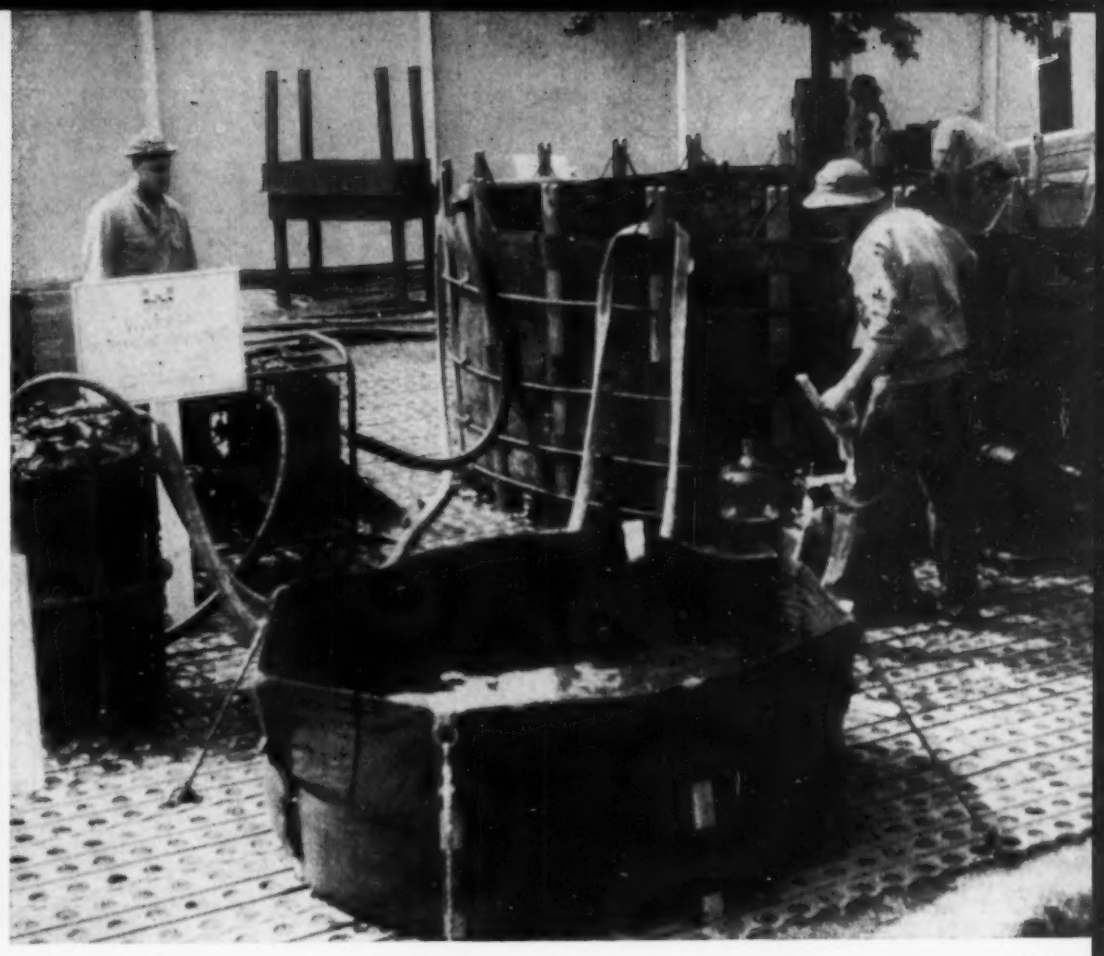
Power Tools—Every Engineer unit carries with it a complement of standard power tools operated by compressed air or gasoline engine. Pictured herewith are a group of rock drills and paving breakers. In the field these tools are served by a portable air compressor mounted on a motor truck for quick mobility to points of use. The compressor illustrated herewith is a Le Roi gasoline-engine driven unit rated at 105 cu. ft. per min. and carried by a GMC truck.

Another useful power tool is the port-

RUBBER PONTON FLOATS measuring 33x9 ft. (below) are inflated with air at 2 lb. per sq. in. pressure to carry steel grid treadway panels (above, left).



CAPTURED FROM GERMANS is this pneumatic paving breaker.



POTABLE WATER for troops in war theaters is supplied by portable purification units equipped with both hand and power pumps and collapsible canvas storage tanks.

able mechanical chain saw widely employed in felling and bucking trees, cutting bridge timbers and piling and for dock work. Herewith pictured is a Mercury gasoline-powered Disston unit with 36-in. long blade having an operating speed of 1,200 ft. per min.; behind it, in the picture, is a captured German saw of similar type, but heavier and harder to operate.

Bridge Building—In a mobile war such as our armed forces are now fighting, bridge-building equipment assumes a role of primary importance. The Engineer exhibit showed the latest type of inflated rubber ponton float carrying a treadway of steel grating, as illustrated. The rub-

PORTABLE AIR COMPRESSOR (above) is Le Roi gasoline-driven unit, with capacity of 105 cu. ft. of air per min., mounted on GMC truck for quick mobility to points of use.

ROCK DRILLS and paving breakers (below) served by portable air compressor, are standard Engineer equipment. Two units at right are captured German equipment; other two are American units.

FIRE-FIGHTING TRUCK (below) has 1,000-gal. tank, high-pressure pump and monitor nozzles. It is here shown standing on airfield landing mat of pierced steel plank.

ber pontons measure 33x9 ft. and are inflated with air from a compressor at 2 lb. per sq. in. pressure. An improved feature of the modern ponton float is its sectional construction. Transverse bulkheads divide each unit into 12 compartments, each separately inflated, so that if the float is hit by enemy gunfire air escapes only from the sections perforated by bullets or shell fragments, the buoyancy of the undamaged sections being sufficient to keep the bridge afloat. For handling the 24-ft. long steel grid treadway or deck panels of these ponton bridges, the Engineers employ a specially designed 6-ton Brockway truck equipped with a Heil 4-ton crane with a 14-ft. boom which unloads and places the steel grid treadway sections with the aid of chain slings, as shown in one of the pictures. Ponton equipment of this type was used successfully in establishing a crossing of the Volturno River, in Italy, under enemy fire.

Fire Fighting Truck—For extinguishing fires of all sorts, caused by airplane crash landings, enemy air-raid bombing, and artillery fire the Engineers operate several types of fire-fighting equipment. The largest unit, here pictured, is a 16-ton truck carrying a 1,000-gal. tank, high-pressure pump, and monitor nozzles for discharging streams of water where needed.

Searchlights—Both American and captured German searchlight equipment were on display at the exhibit. The German searchlight is a 60-cm. unit for anti-aircraft defense and is traversed and elevated rapidly to spot its target by an operator in a seat mounted on and revolving with the machine. This searchlight is employed principally for low-altitude

(*Continued on page* 138)

AIR-INFLATED RUBBER BOATS present contrast between American (left) 6-man and German (right) types. American boat has six independent inflated sections while German boat is in one unit.

CHAIN SAWS of American (in front) and German manufacture are units of similar type, driven by gasoline engines.

CAPTURED GERMAN SEARCHLIGHT (left), a 60-cm. unit for anti-aircraft defenses, is revolved and elevated by operator who sits in revolving seat mounted on framework.

AMERICAN ANTI-AIRCRAFT SEARCHLIGHT is 60-in. machine casting 800,000,000-candle-power beam. Reflecting mirror is of steel and functions even though hit by bullets. It is served by portable gasoline-driven electric generator.

ARMY ENGINEERS REPAIR

Rome's Principal Port

BULLDOZER levels ground at Rome's principal harbor to facilitate unloading of Allied supplies from landing craft.

Signal Corps Photos

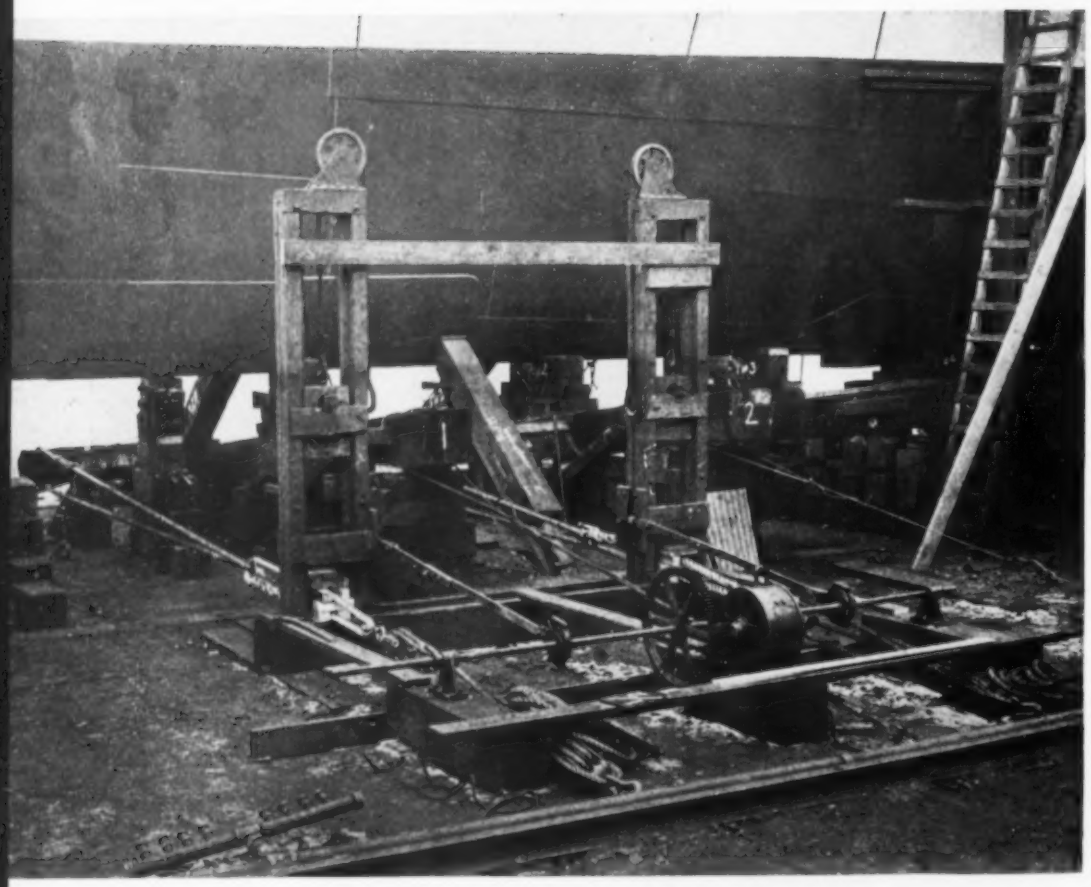
REPAIR WORK on the large harbor of Civitavecchia, Italy, principal port of Rome, is shown in these official Signal Corps photos. Extensive damage was inflicted on the harbor by Allied Fifth Army, prior to capture of city.

ARMY ENGINEERS set logs in place to serve as makeshift raft for unloading ships. In background repair work proceeds on harbor.

RUBBLE AND SUPPLIES are hauled by Army trucks (below) from harbor which is being repaired. Truck-mounted air compressors and tractor-bulldozer units aid work of restoration.

PILEDRIVER (below) drives down rails to be used in constructing pier at Civitavecchia harbor.

Shipyard "Guillotines" CUT HAWSERS TO RELEASE HULLS FOR SIDE LAUNCHING

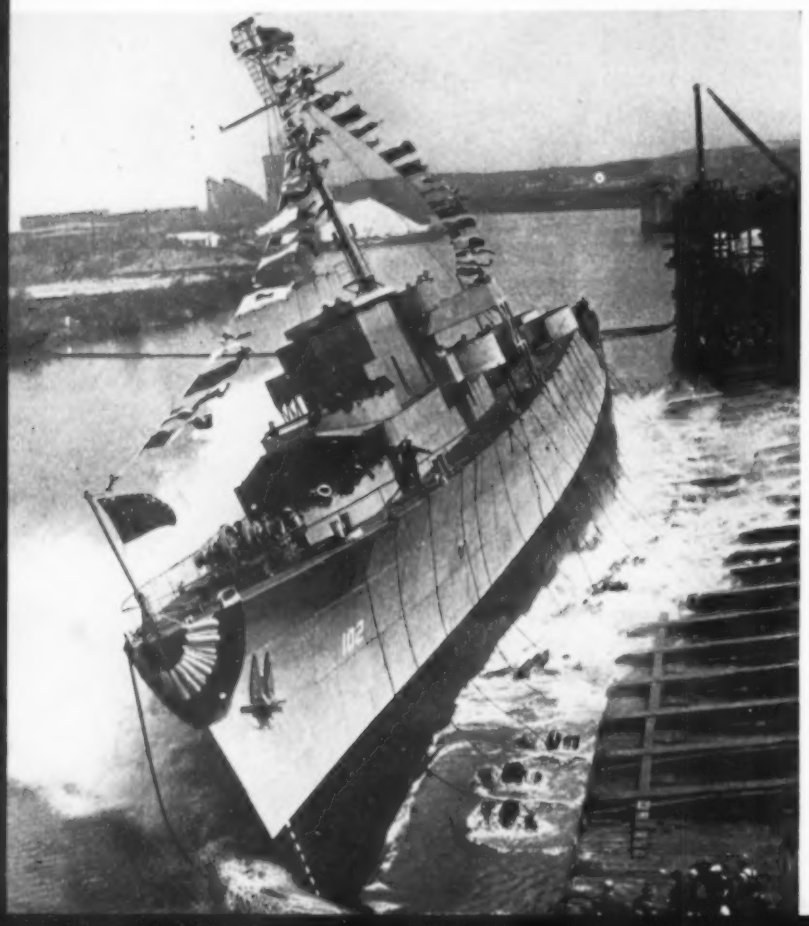


PAIR OF GUILLOTINES at both bow and stern are equipped with weighted knife edges operating in vertical leads like a pile driver. Electric motor turns shaft equipped with cams and rods which are withdrawn from thimbles on holding lines, thus allowing weights to drop and cut hawsers holding ship on ways. In this view weights are blocked to prevent accidental drop prior to launching.

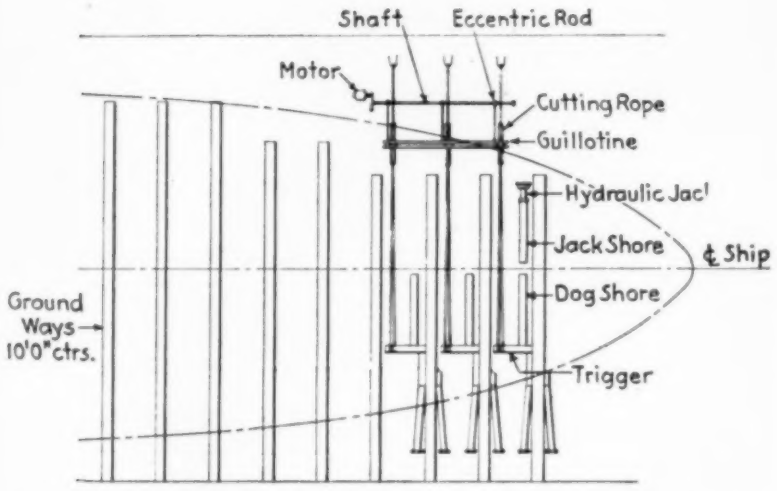
EXPERIENCE IN CONSTRUCTION for war has left shipbuilders on the Great Lakes more firmly than ever wedded to their preference for side-launching. With water frontage comparatively inexpensive, they contend that advantages of preassembly, construction on an even keel, plus launching ease, confirm the wisdom of their practice. The not infrequent necessity of launching into a narrow basin or river is another factor in the choice of methods. A major disadvantage, however, is that it is necessarily impractical to have cranes working on both sides of the ship under construction.

Vessels at the yards of the American Shipbuilding Co. are built on ground ways made of 24x18-in. timbers, spaced 10 ft. on centers. When ready for launching, the weight of the hull is transferred from keel blocks to the inclined launching way by jacking it up with wedges and removing all shores.

The release of the ship for its slide, sidewise, down the inclined launching ways is accomplished by cutting the hawsers that hold it with pairs of "guillotines," located at the bow and at the stern, and operated simultaneously by electric motors. Each guillotine is equipped with a heavily weighted knife-edge sliding in vertical leads like a pile-driver. Each weight is suspended by a short length of rope passing over a sheave and terminating in a thimble through which passes the end of a horizontal rod, as shown in the accompanying illustration. The other end of this



WITH BIG SPLASH ship is launched sidewise in narrow channel (left), dropping from end of ways and entering water with only slight list.



DETAIL OF LAUNCHING SETUP shows ground ways, shores, trigger and cable-cutting "guillotine" for releasing vessel.

rod is connected with a cam on a shaft from an electric motor. When the ship is ready for launching, a single switch is thrown to start all electric motors at the same time, causing the withdrawal of the rods from the thimbles on the weight-holding lines and the release of the weighted guillotine knives which drop on and cut the hawsers holding the hull allowing it to slide down the greased ways into the water. The system has the advantage of never releasing the ship before a nervous sponsor has cracked the champagne bottle over the stem.

A slope of 1⅝ in. per 1 ft. on the launching ways insures sufficient sliding speed so that the vessel clears the ends of the ways. There is rarely more than a 1-ft. drop to the water. A huge wave is, of course, thrown up as the vessel leaves the ways, preventing any serious roll.

WEDGES ARE DRIVEN (right) to transfer weight of ship from keel blocks to sliding way just prior to launching. View is from waterfront side.

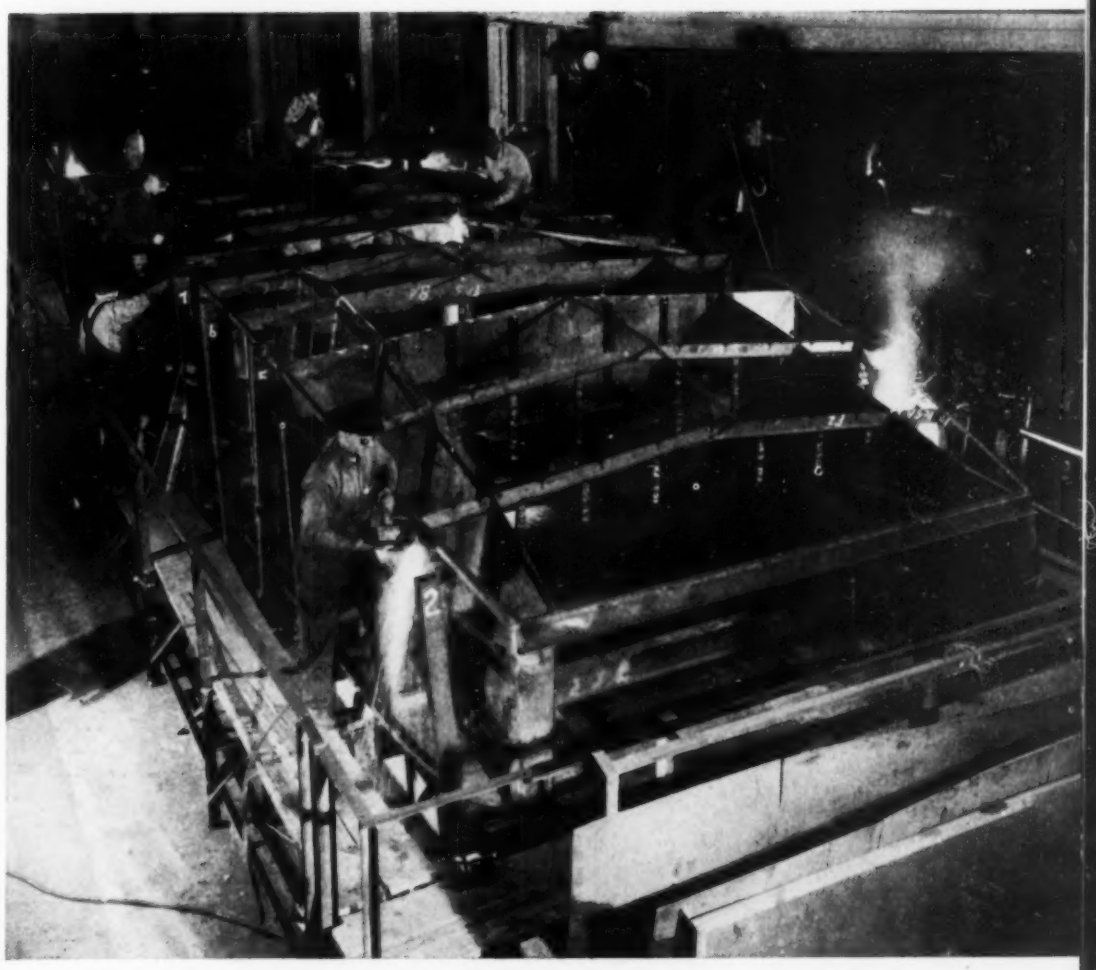
Tank-Landing Barges

BUILT UPSIDE DOWN BY ASSEMBLY LINE WELDING

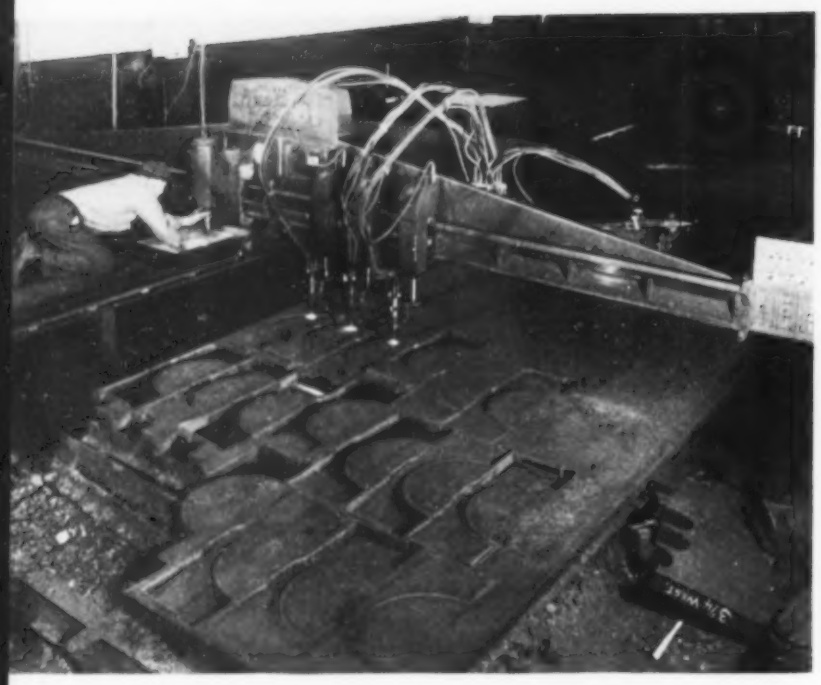
LANDING BARGES designed to carry one medium-size tank and various types of Naval equipment and personnel, are being constructed for the Navy by the Warren City Manufacturing Co., of Warren, Ohio, by assembly-line methods. Each LCM-3 (Landing Craft Mechanized) lighter is 50 ft. long, 14 ft. wide and weighs approximately 25 tons.

The all-welded, diesel-powered steel barges are first built upside down with the aid of special fabricating jigs and then turned rightside up for final fabrication and engine installation. The first landing craft built at the company's $9,000,000 plant required 23 working days, but one is now completed every 48 hr. As the plant is located far inland, the company has built its own "indoor ocean"—a 34,000-gal. test tank. Here hulls are checked and the diesel power plant gets a 2-hr. break-in. After this test launching, the barges are placed on their sides, loaded on flat-cars, or railway gondolas, and shipped to points of embarkation.

Of sturdy construction, these craft can go through breakers, ground on a beach,

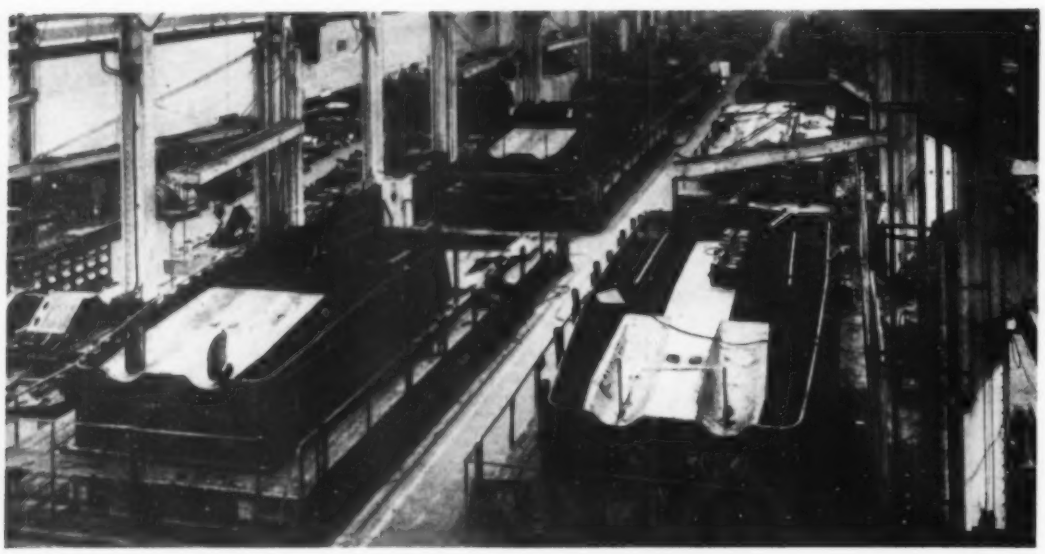


CONSTRUCTED UPSIDE DOWN by assembly line methods in special fabricating jigs, landing barge (right) reaches final stages of framework and rib construction, prior to installation of bottom plates.



MULTIPLE-NOZZLE FLAME CUTTER, controlled by template, slices through heavy steel plate.

DECK PLATES are welded to supporting channels and beams in well section after barge, constructed upside down, has been turned by crane.

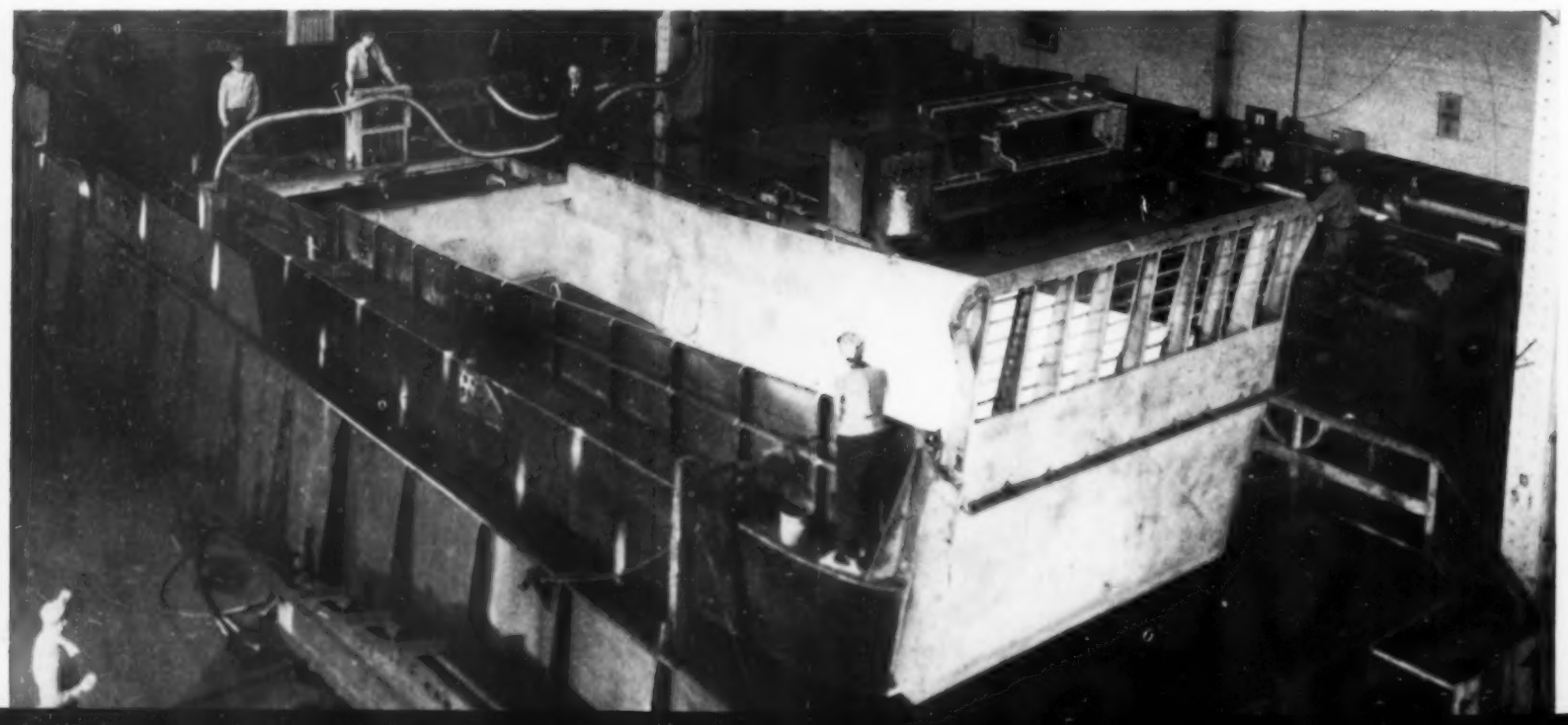


ON ASSEMBLY LINE of Warren City Manufacturing Co. are LCM-3 tank-landing barges in various states of construction. Twin rudders are in place on lighter at left. Completed barges are 50 ft. long and 14 ft. wide and weigh about 25 tons.

and pull off under their own power. Barges of this type have been used in the South Pacific and have played a leading role in the invasion of France. With more than 20,000 on hand, the Navy wants 80,000 by the end of the year.

The construction of the landing craft at the Warren City Manufacturing Co. plant is under the supervision of Capt. R. T. Hanson, USN, Navy supervisor of shipbuilding and inspector of naval material for the Cleveland District. Captain Hanson states that landing craft carry the No. 1 priority for Navy construction.

"INDOOR OCEAN" of 34,000-gal. capacity (below) serves as testing tank for landing barges at far-inland plant. Here lighter is being lifted from tank after 2-hr. test. Woman worker, at right, starts cleaning in preparation for final painting.

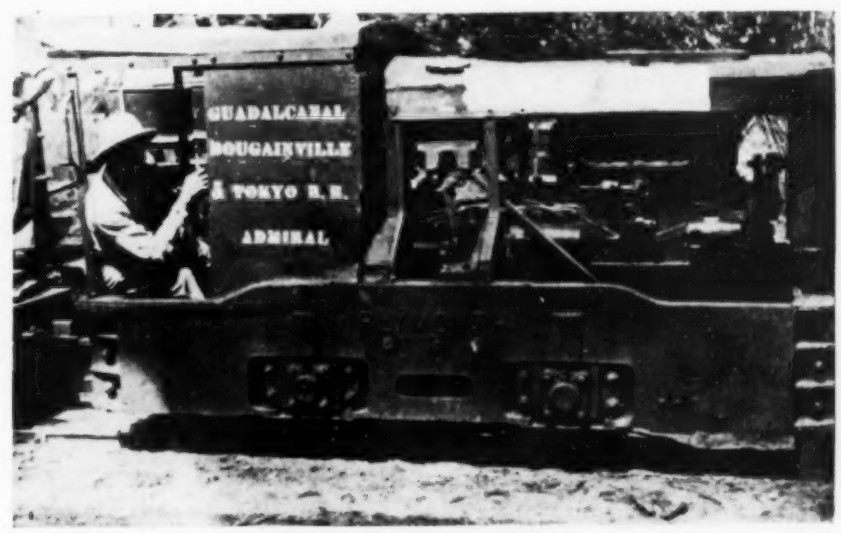


JOB oddities

CHINESE FOOTPOWER operates treadles which turn wheels to draw water into flume on huge bomber base in China, which is being built under U. S. Army supervision by 70,000 coolie laborers using primitive equipment.

Photo from European

LAUNDRY PROBLEM on construction job in Pacific war theater, where steady breeze blows, is solved by this homemade washing machine, powered by small windmill rigged up by ingenious member of Navy's Seabees. Horizontal shaft rotated by propeller operates vertical crankshaft with plunger extending into water bucket. This rig is known as "two-shirt" size.



GUADALCANAL DIVISION of "Guadalcanal, Bougainville, and Tokyo R.R." is built by Navy's Seabees, who completed 1.22-mi. route in three days and took just two days more to build its pier terminus. Motive power for trains is provided by three Plymouth gasoline-powered engines. They are driven from right side of cab by "engineers" of Army Service Command.

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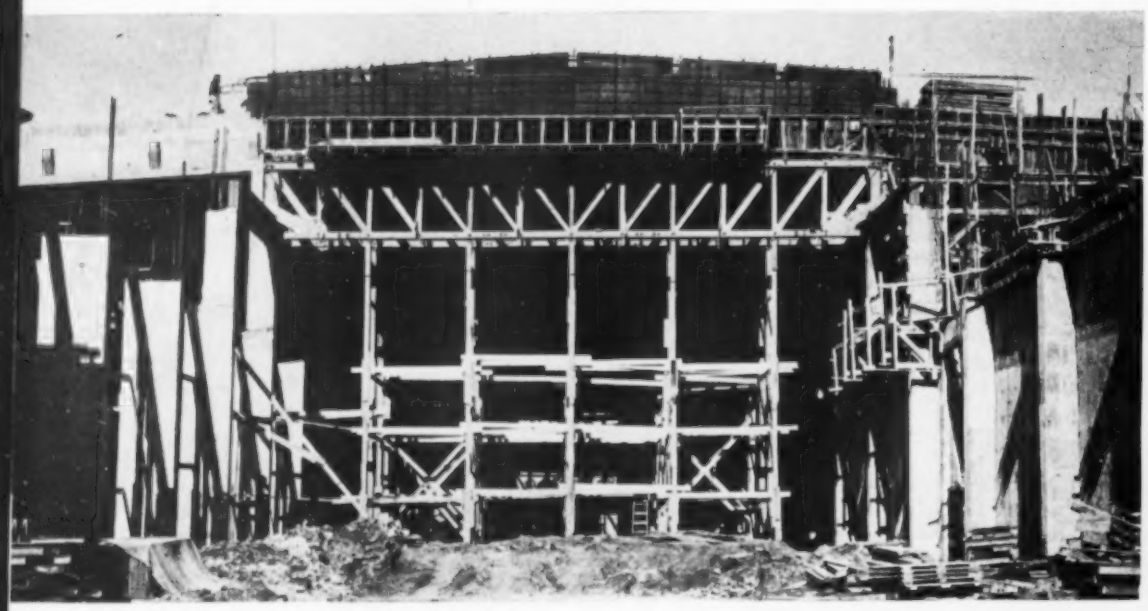
"TWIST COURSE" provides severe test for trucks at Fort Wayne, Ind., proving ground of International Harvester Co. (below). Constructed of concrete, it consists of diagonal depressions ranging in depth from 12 to 19 in. Trucks driven at predetermined speed over this course are subjected to repeated twisting stresses similar to those experienced in off-highway service.

Naval Ammunition Depot COSTIN

By R. L. VAN KEUREN

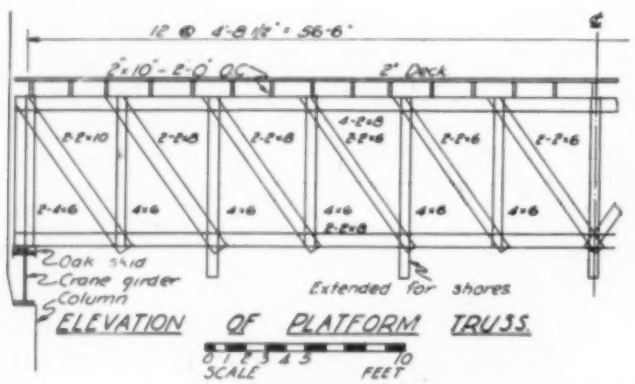
Office Engineer
Maxon Construction Co., Dayton, Ohio

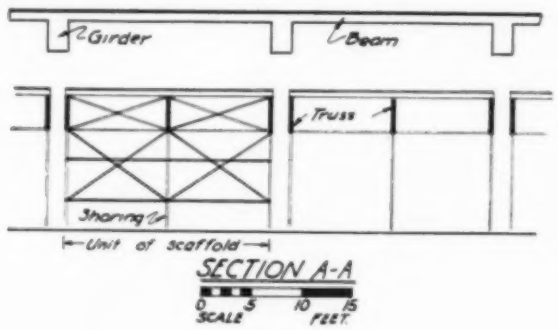


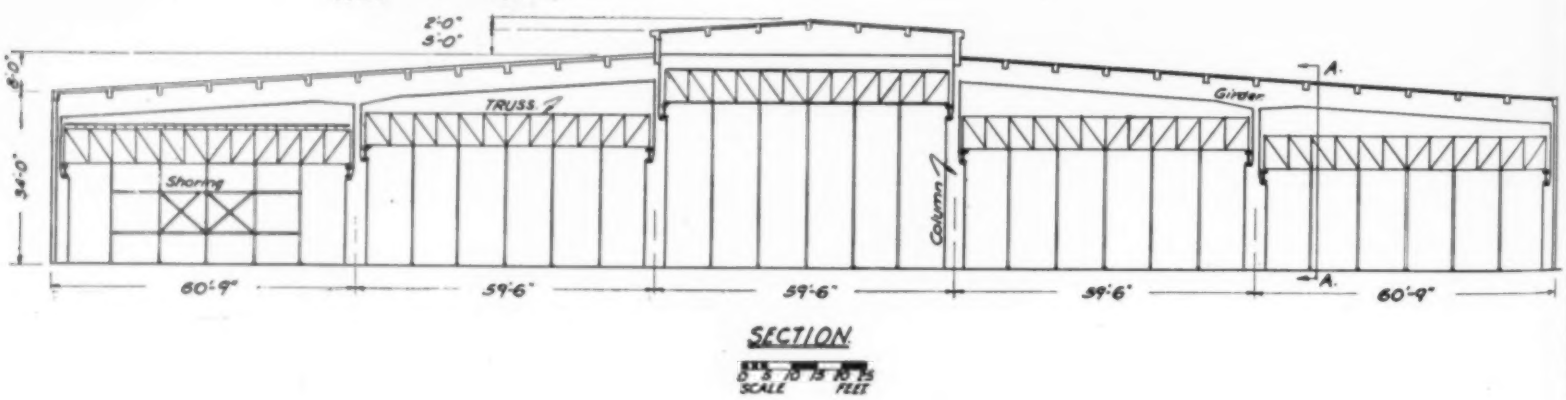
WAREHOUSE ROOF is poured on forms shored from movable, truss-supported platforms which carry knock-down forms during moving. Beam and girder roof system of this 300x666x42-ft. reinforced concrete building prevented use of usual rolling and retracting forms. Platform was skidded on steel crane girders atop concrete columns.

DETAILS THAT AIDED CONSTRUCTION

1. Special tractor-drawn plow excavated drainage ditches
2. Kraft paper and limestone talc protected membrane waterproofing
3. Tarpaulin-covered wood arches used during cold-weather concreting
4. Panel forms erected from movable truss-supported platforms
5. High-early-strength concrete speeded stripping of forms







UNIT FORMS (below) of powder storage building wing wall are ready for pouring of concrete. Later, structure is covered by earth blanket.

PLATFORM TRUSS was used for support of roof forms for concrete warehouse.

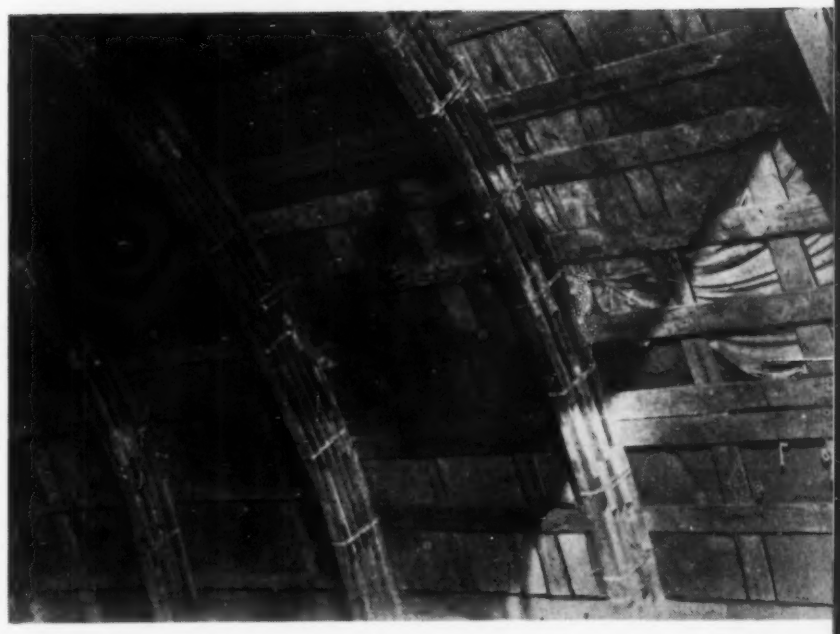
UNIT FORM PANELS (below) of steel expedite construction of 1,200 concrete igloos.

$60,000,000, INCLUDES 1,985 BUILDINGS

THE $60,000,000 NAVAL AMMUNITION DEPOT built in Indiana by Maxon Construction Co., Inc., for the Bureau of Yards and Docks, U. S. Navy Department, occupies a site of 100 sq. mi. of hilly and generally wooded land. Originally intended to provide a permanent depot for the Atlantic fleet, work was begun a year before Pearl Harbor. Surveys, plans and specifications were prepared by Russel B. Moore & Co. of Indianapolis, Ind. from basic designs and requirements of the Bureau of Yards and Docks, of which Vice Admiral Ben Moreell is chief.

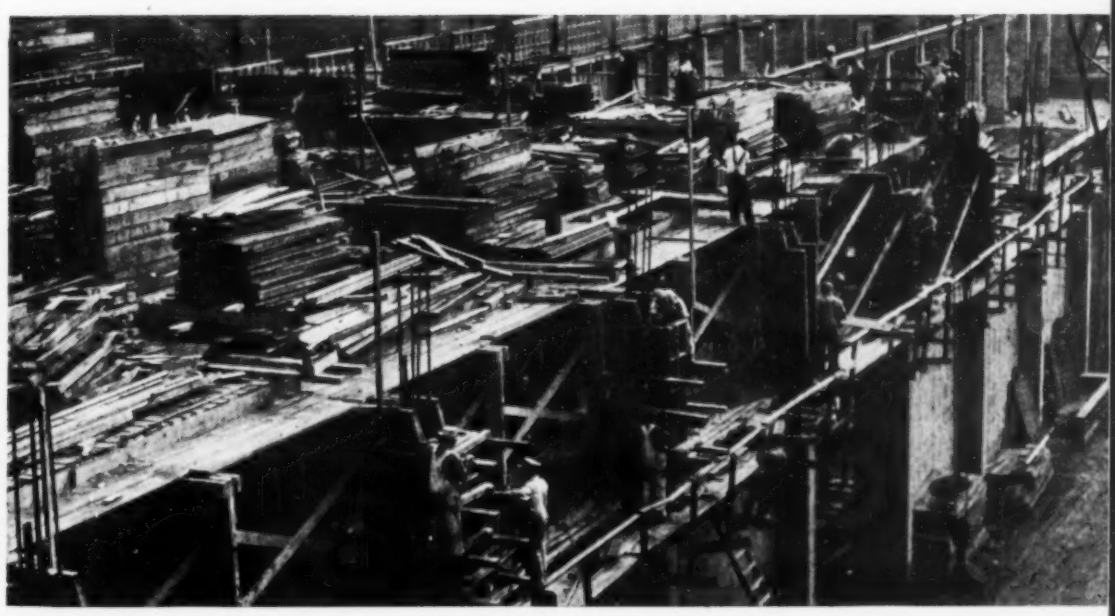
After Dec. 7, 1941, the character of the work did not change, but the scope and tempo were continually stepped up to meet the demands of a rapidly expanding Navy. How well the job kept pace with the demands is evidenced by the fact that in a public works competition conducted by the Bureau of Yards and Docks it placed third out of 30 competing jobs, second out of 115 competing jobs, and first, three times, out of 36 competing jobs. The builders received the Army-Navy E for the first period it was available to construction contractors and an extension of the E Award for the succeeding period.

The 1,985 permanent fireproof buildings constructed at this writing provide a total of 7,000,000 sq. ft. of floor space, supplemented by many acres of paved outdoor storage yards for materials not requiring housing. The site, though isolated, is

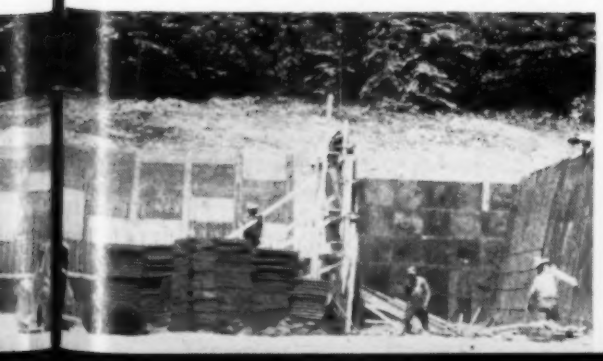


TARPAULINS for protection of concrete in winter are supported by laminated rib arches of wood.

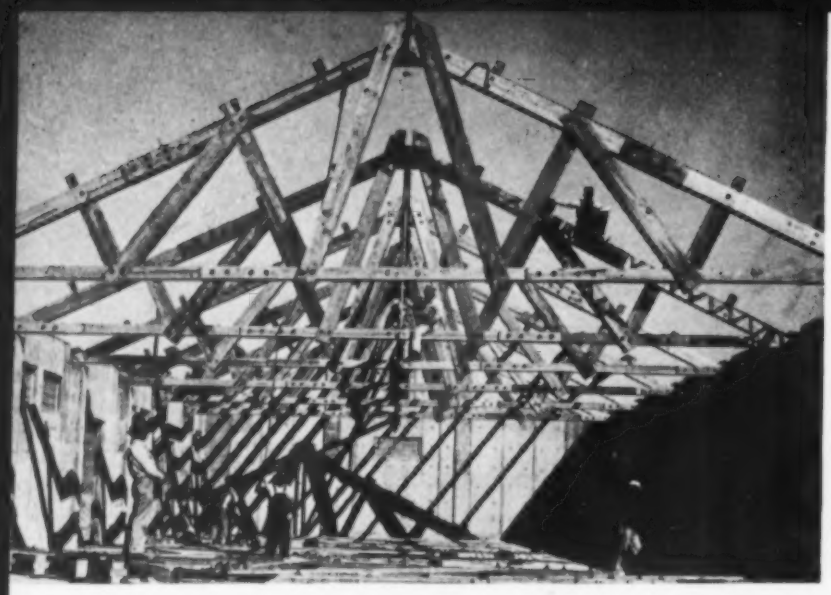
DIRECTING CONSTRUCTION are **LIEUT. A. P. PASQUARIELLO, U.S.N.R.**, officer-in-charge of construction (left), and **A. C. ALT**, general superintendent for Maxon Construction Co., Inc.



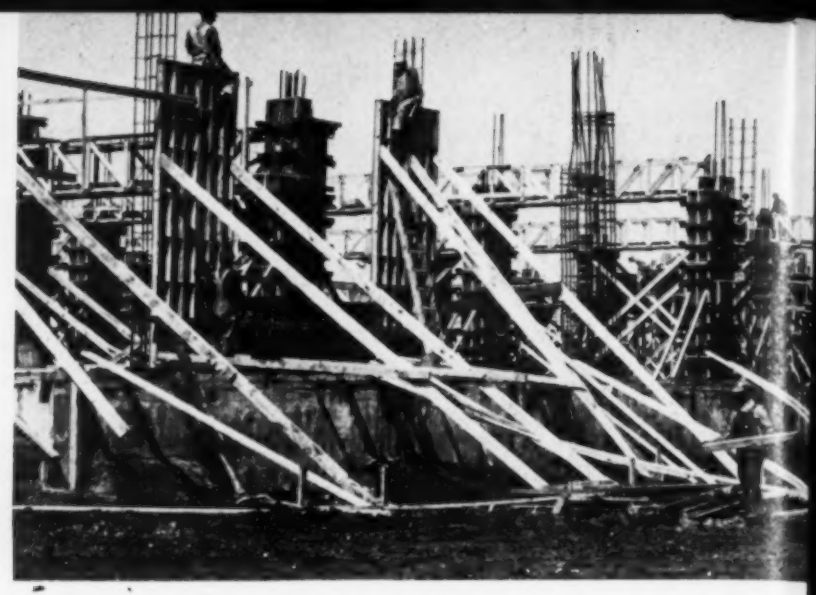
FORMS ARE PILED on working platform and moved in three truss sections.



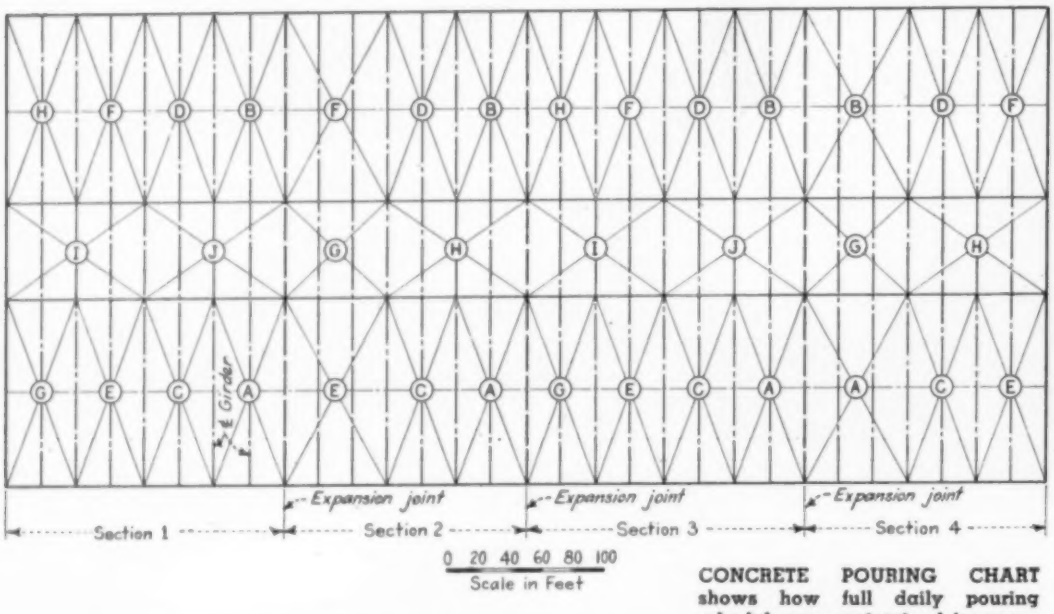
UNIT FORM PANELS (below) permit fast erection and stripping in all types of buildings. This is one of 450 large earth-covered powder magazines. Use of this type of form solved problem of skilled labor scarcity and kept costs down.



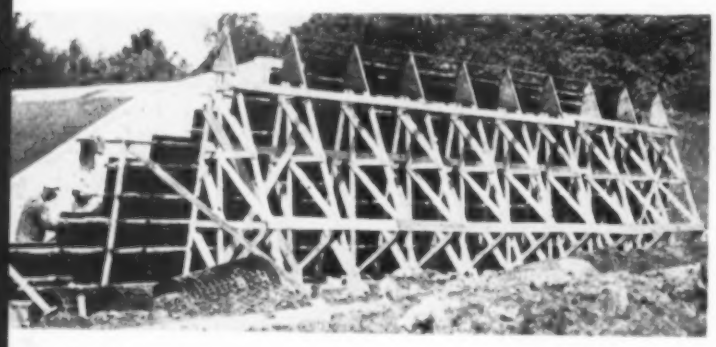
TIMBER TRUSS MEMBERS, prefabricated at central mill, are assembled on floor of buildings with timber connectors. Crawler cranes erect completed trusses.



TOWED BY BULLDOZER (below), falsework leapfrogs railroad cuts and all obstructions.

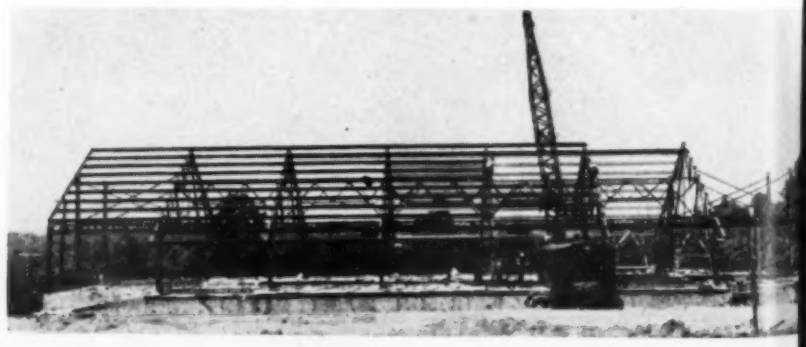


CONCRETE POURING CHART shows how full daily pouring schedule was maintained for warehouse. Side bays were poured first, alternate sides on consecutive days, moving forward. Building was divided by expansion joints into four sections and enough forms were provided for one complete section.



TRUSSED FRAMES (left) support back forms on inclined retaining walls of concrete igloo magazines.

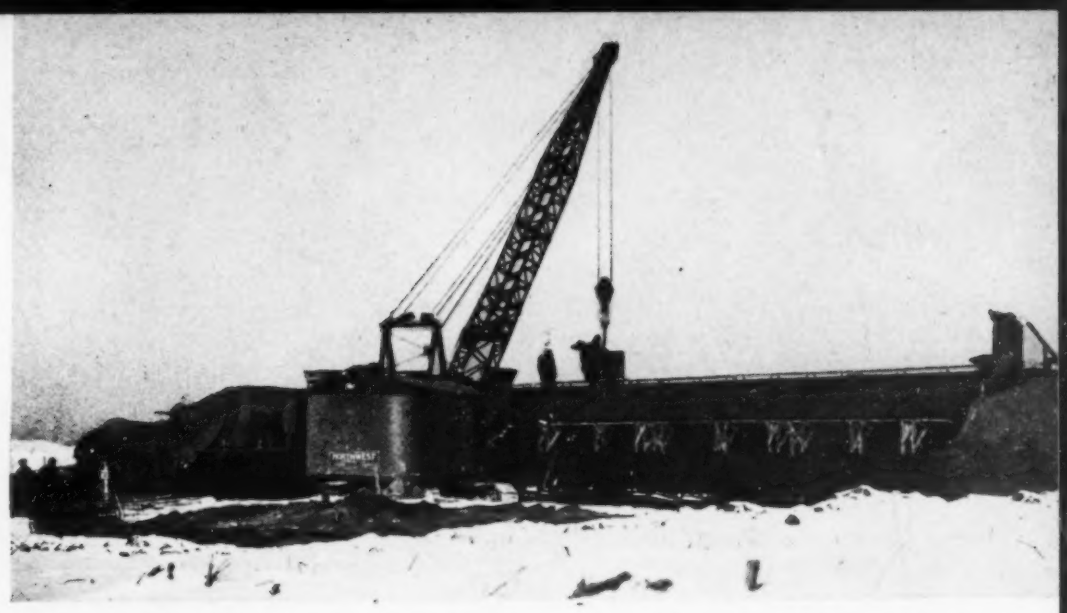
TRANSIT MIXERS (left) are loaded from Butler central batching plant at rate of 110 cu. yd. per hr. Aggregate and water were heated at same rate in winter.



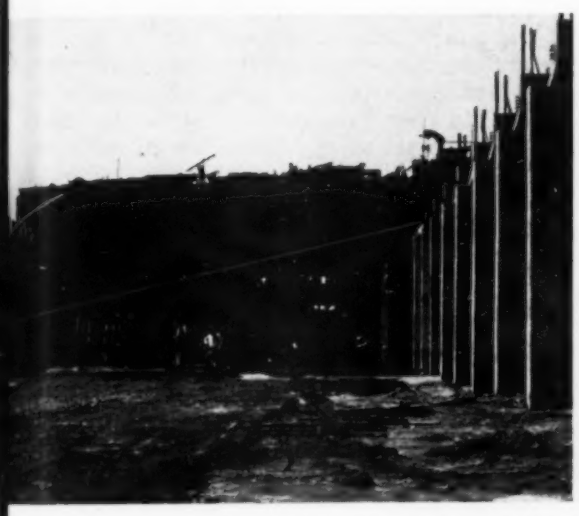
GENERAL STOREHOUSE (above) of fireproof construction is erected with aid of Northwest crawler crane.

traversed by two state highways, a branch of the Chicago, Milwaukee, St. Paul & Pacific Railroad, and an adequate 66,000-v. electric power transmission line. The area included a lake of 815 acres. Intramural extensions of utilities to serve this highly industrialized community include 230 mi. of highway, of which 25 mi. are high-type concrete or asphaltic surface, and the remainder

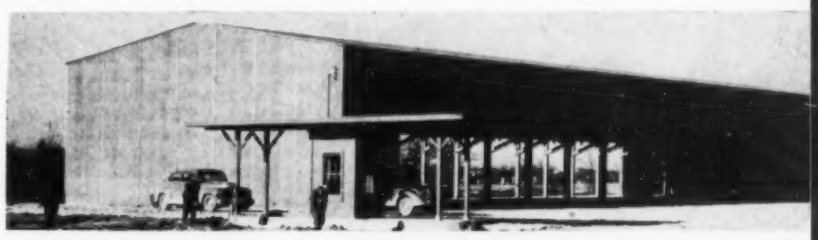
LIGHT TRUSSED CATWALKS brace and plumb columns, facilitating access for concrete placement.



CONCRETING OF IGLOO magazine proceeds during winter, with calcium chloride added to mix. Bottom-dump bucket is handled by Northwest crane.



AFTER COMPLETION of reinforced concrete warehouse (below), platform trusses employed in its construction are used in shed (right) for storage of heavy equipment and trucks.

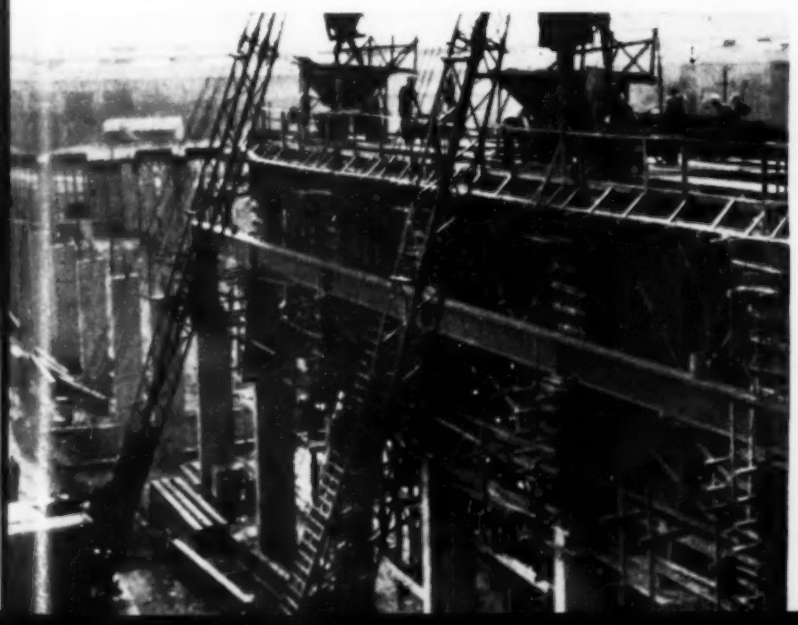


macadam; 125 mi. of railway, including two train-size wyes at junctions with main line; three classification yards; two scale-tracks; four terminals for collection and distribution of carloads and trains; 60 mi. of telephone line with two exchanges; and 56 mi. of electric transmission lines served by a 6,000-kva. substation and 57 distributing stations. Because of the hazardous occupancy, much of the systems of communication and power transmission was underground and of explosion-proof construction.

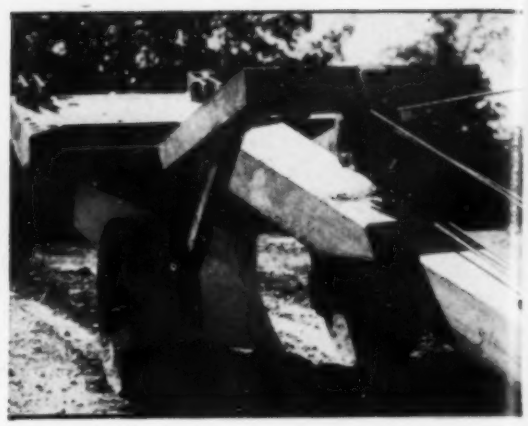
As the depot is adjacent to the famous Indiana limestone districts, excellent quality stone was available for roads and ballast. A total of 1,700,000 tons was produced by Ralph Rogers Co. of Bloomington, Ind. from a quarry located just off the depot site and delivered by truck for highways and for base course of railways. The Louisville Cement Co. produced 500,000 tons of stone at its New Albany, Ind., plant and delivered it by rail for final ballast and concrete aggregate.

By keeping the railway and highway roadbeds and base courses in advance of the structural building program the contractor made Navy dollars do double duty, providing access which permitted

CONCRETE IN BUCKETS (below) is hoisted from truck-mixers to hoppers on roof of warehouse by two Lorain crawler cranes with 75-ft. booms.



CONCRETE FOR WAREHOUSE ROOF is delivered by rubber-tired buggies loaded from hoppers.



LARGE PLOW, built by contractor and mounted on standard LeTourneau rooter, (left) digs 3 mi. of drainage ditches per 8-hr. shift. Caterpillar-drawn and operated (right), its low center of gravity makes it easy to keep ditches straight in any terrain. Only small amount of cleaning out after plow is necessary.

EARTHMOVING OPERATIONS were carried on by fleet of 28 scrapers and 70 tractors, of which this Caterpillar with LeTourneau 15-yd. scraper forms part.

CRAWLER WAGON, an Athey side-dump quarry trailer, is used to move rock loaded by Northwest shovel at site of smokeless powder building.

SUBGRADE AND BALLAST (left), in foreground are prepared for railroad to serve one of 450 large earth-covered smokeless powder magazines, spaced over 3,000 acres. Crane in background moved a mile a day to serve five buildings.

summer schedules to be carried through the winter and at the same time enabling traffic to bind base courses over generally unstable subsoil. To these surfaces were applied finish courses of ballast or road stone stabilized by liberal use of calcium chloride, with gratifying results.

A lake, previously built by the state for recreational uses, was enlarged and reinforced to form an adequate reservoir. A pumping and water treatment plant with a capacity of 720,000 gal. per day supplies all domestic and fire needs. Distribution is through two elevated tanks of 200,000-gal. capacity and 64 mi. of piping made of asbestos-cement Transite to conserve metal. The depot is served by an activated-sludge sewage disposal plant, four pump lift stations and 20 mi. of sewers. Lightweight concrete manhole covers, contrived to conserve metal, were generally used and proved satisfactory.

Excavations totaled 14,500,000 cu. yd. of earth and 750,000 cu. yd. of rock, employing 70 Caterpillar and International tractors, 28 LeTourneau and Gar Wood scrapers, 12 crawler draglines and shovels, two truck cranes, and a fleet of 100 trucks. Handling and distribution of construction materials and personnel employed an additional 32 Lorain, Marion, Northwest and Link-Belt crawler and truck cranes, 800 Chevrolet, Dodge, International and Ford trucks, one locomotive, one Ohio locomotive crane and two Wiley whirley cranes.

Terrain was irregular, with sharp, hilly slopes draining to numerous dry branches, and thence to three substantial creeks. Land utilization was, therefore, low, but the entire area was occupied and the buildings and roads provided accelerated runoff which the road and rail ditches served to concentrate. The result tended

(*Continued on page* 132)

LEGAL ADVENTURES of TRACTOR CONN

By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

This series of articles, dealing with the Legal Adventures of Tractor Conn, a typical contractor anywhere in the United States, explains some of these legal points in plain language for the contractor. Each one is based on an actual decision of an American Court.

The Case of the Sunday Stop

"Did you stop payment on the check of mine I gave that jobber?" Tractor Conn queried.

"I'm glad you came in," the cashier of the Contract Bank told him. "I was going to call you up. No, we just paid the check in full."

"Paid it! Why you told me on the phone that you'd enter a stop pay order as soon as you came in this morning. Say, I'll have your hide if I have to go to Washington to get it."

"You needn't go that far," the cashier pointed out. "Just sue the bank for the amount of the check, but you haven't a Jap's chance."

"How do you make that out?"

"Your stop payment order won't stand law. In the first place, it was given over the phone; in the second place it was given on Sunday; and in the third and last place I wasn't at the bank when I received the order," the cashier argued.

"I'm still going to sue," Tractor Conn persisted, was as good as his word, and won in a case reported in 252 S. W. 161.

"We do not say whether or not, as a matter of law, a cashier could refuse to receive this notice over the telephone at his home on Sunday. That question is not before us. But we do say that the action of the cashier in receiving the notice as he did very naturally lulled Conn into a sense of security and kept him from acting further in his own behalf in person," said the Court in ruling in Tractor Conn's favor.

The Case of the Disputed Guarantee

"I am in receipt of yours of recent date, inclosing postdated check. I am sorry that I cannot accept this unless you make satisfactory arrangements with your bank that it will be honored on presentment," Tractor Conn wrote. The debtor promptly took the check to the bank on which it was drawn.

"Will you agree to honor this check, when it's presented," he queried, "and will you telephone and write Tractor Conn telling him that you're holding the check and that it will be paid on presentment?"

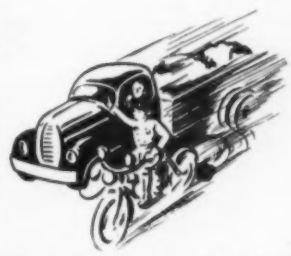
The bank phoned and wrote as per request and Conn acted on the faith thereof. The check was dishonored on presentment and Conn sued the bank in the North Dakota courts.

"We rely on the bank's letter as a binding guarantee," Conn's lawyer argued.

The letter was a guarantee of the debt of a third party beyond the powers of a bank," the bank's lawyer retorted. The Court overruled this contention and decided in Conn's favor, in 194 N.W. Reporter, 387.

"The transaction may properly be considered as an independent undertaking in the nature of a letter of credit within banking powers," was the reasoning of the Court.

The Case of the Stolen Truck



Tractor Conn was talking to the manager of the McGee Motor Sales in an excited tone.

"Listen, McGee, this is Tractor Conn. That special dump truck I bought from you was stolen last night. Have you another one I could hire for love, money or what have you?"

"No, nothing that would hang together 24 hours, but if I can get a permit from the proper authorities, I'll sell you a new one with the greatest of pleasure," McGee assured him.

"Can't pay for the two trucks in one season," Conn demurred.

"Who mentioned pay? I insured that truck for you against collision, fire and theft."

"I was so excited I forgot all about that," Tractor admitted. He filed his proof of loss with the insurance company that forenoon, bought a new truck an hour later, and 70 days later the insurance adjuster telephoned him.

"Glad to report the police have recovered your stolen truck. It cost about $50 to put it in first-class order, and we'll deliver it to you tomorrow," the adjuster explained.

"My truck? You must mean the one that somebody stole out'a my garage this summer, but that's yours now," Conn protested. "Your policy says that the loss shall be payable in 60 days, and 60 days after you get the claim papers you're bound to pay for the truck, although it might be found 10 seconds after the 60 days expire."

And the Illinois Supreme Court in O'Connor vs. Maryland, reported in 3 A.L.R. 793, decided that Tractor Conn was right.

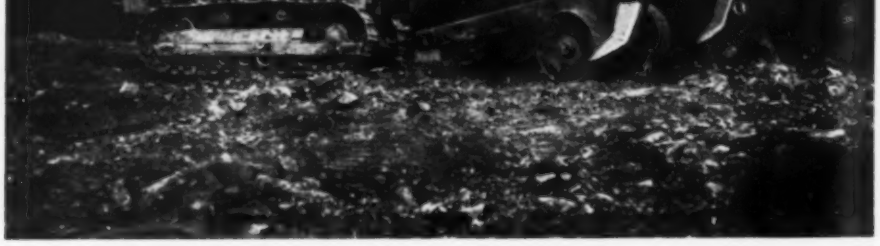
"In order to make an insurance policy of this kind of value to the owner of the property, there must be some time fixed after which the return of the property will not release the company from liability," said the Court.

More Legal Adventures of Tractor Conn Next Month

TWENTY-TWO YARD CARRYING SCRAPER pulled by tractor hauls material down specially constructed service roadway from bench to highway.

Scrapers

Flatten Slopes of Deep Highway Cut



RIPPER PLOW weighing 7 tons is eased out to brink of cut by D-8 Caterpillar tractor to uproot large boulders.

WIDENING A HIGH, STEEP SLOPE of a highway cut alongside heavy traffic is usually a job for shovels, but a contractor in western Pennsylvania successfully used rooters and scrapers in trimming back the high banks at the east approach of the George Westinghouse Bridge in East Pittsburgh, Pa. Here 270,000 cu. yd. of earth, loose rock and boulders are being sliced off the steep hillsides to eliminate a hazard to traffic that has worried the Pennsylvania state highway commission for years. Falling boulders within the cuts in the 1-mi. approach area have been a constant threat to damage of property and life. The only remedy lay in cutting back the slopes and reducing their gradient. The task was somewhat complicated because of the danger to the flow of traffic over the highways while digging was in progress.

The $300,000 contract awarded to the Hinman Bros. Const. Co. of Pittsburgh, Pa., and Denver, Colo., included the cuts

DEEP CUT (left), where steep slopes are being flattened, measures 150 ft. from top to toe. Note timber barricade along highway to intercept falling boulders before they reach road.

HEAVY TIMBER BARRICADE prevents small material caused by slope trimming from falling into traffic lane.

CONSTRUCTION ROADWAY is built to bench level to aid present operations and to provide access to bench for future cleaning. Note recent 1½ to 1 slope trimming in background, performed by scrapers.

beginning at the east end of the bridge and extending eastward to the Turtle Creek underpass for a total of 1 mi. Operations began on April 4, 1944, in the largest cut at the bridge approach. At the south side, this cut measures 150 ft. in depth at the deepest point from top to toe of slope. An 18-ft. bench is cut along the face of the slope 70 ft. above the roadway. Above the bench, in material largely earth and small rock, the cut is being trimmed back to a 1½ to 1 slope. The fall below the bench to be on a ¾ to 1 slope, is mostly rock and coal structure. Almost half of the total excavation or about 125,000 cu. yd. is contained in this south slope. A heavy 8-ft. barricade, constructed largely of 6x6-in. hardwood timber and strong enough to hold a heavy fill, was built along the entire 900-ft. length of the cut at the toe of the slope. This barrier prevents small rock and earth from falling to the roadway during operations.

In analyzing the project, Hinman Bros. concluded that rooters and scrapers would be the best equipment to use to cut back the slope and at the same time to control the boulders

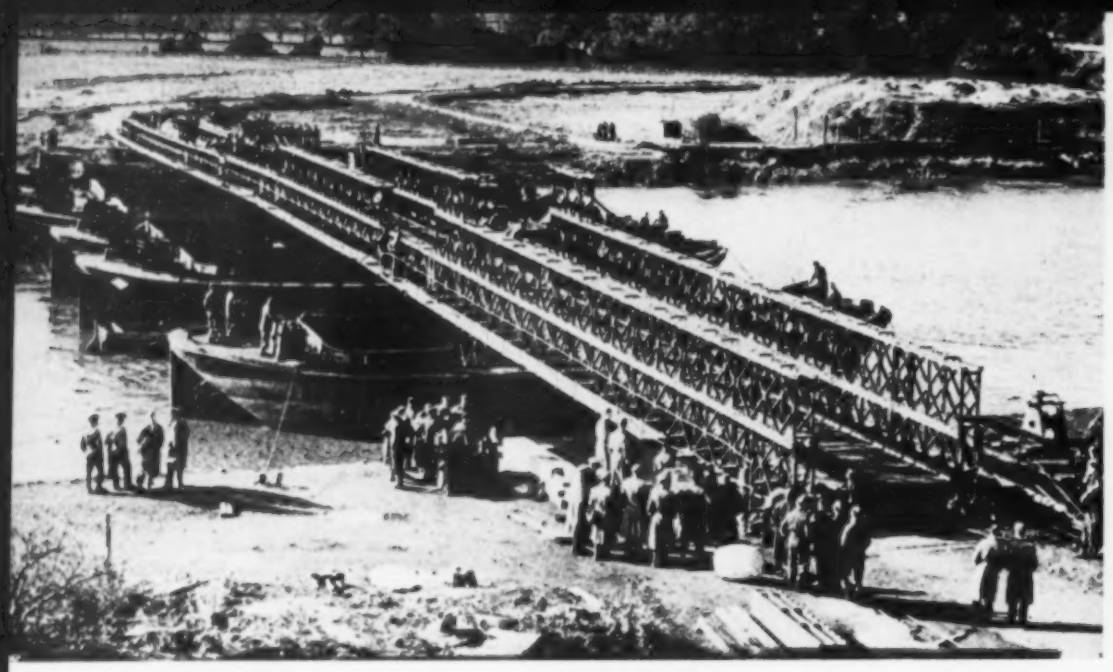
(*Continued on page* 149)

EXCAVATING OPERATIONS are under personal direction of **ROBERT HINMAN** (left), Hinman Bros. Const. Co., Pittsburgh, Pa. Bob, native of Colorado and graduate of University of Colorado, class of '28, came to Western Pennsylvania with his company from Denver in 1939 to work on Laurel Hill section of Pennsylvania Turnpike.

ENGINEERING FUNCTIONS are handled on job by **C. I. McKEE** (right), native of Pennsylvania.

TICKLISH OPERATION (below) is performed here in bench at edge of 70-ft. bank as bulldozer rights overturned ripper plow.

CABLE SLING (below) is quickly wrapped around boulder, which is snagged away from edge by tractor.



PREFABRICATED BRIDGE can span any gap up to 240 ft. without pontons, broader gaps with them. Developed by British army engineers for hurry-up replacement of bridges wrecked by enemy, sections can be assembled into any span length from 15 to 85 ft. Through-type bridges can use two or four trusses, while deck spans can be made of two or three. Parts, made both in United States and England, are interchangeable. Sections are assembled on rollers on bank of gap, and whole bridge is pushed across by erection crew. Press Association Photo

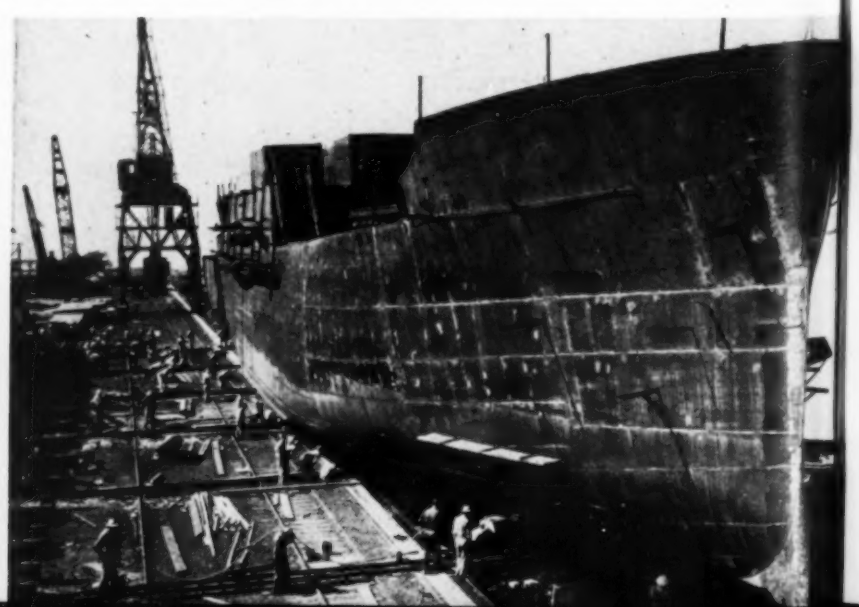
LOADING RUNWAYS used by invasion ships are quickly repaired by special party of Royal Marines stationed at British port from which supplies go to Normandy. Here new slab of concrete is wheeled down runway to replace one damaged ship making quick turn-around. British Combine Photo

HOW *They Did It*

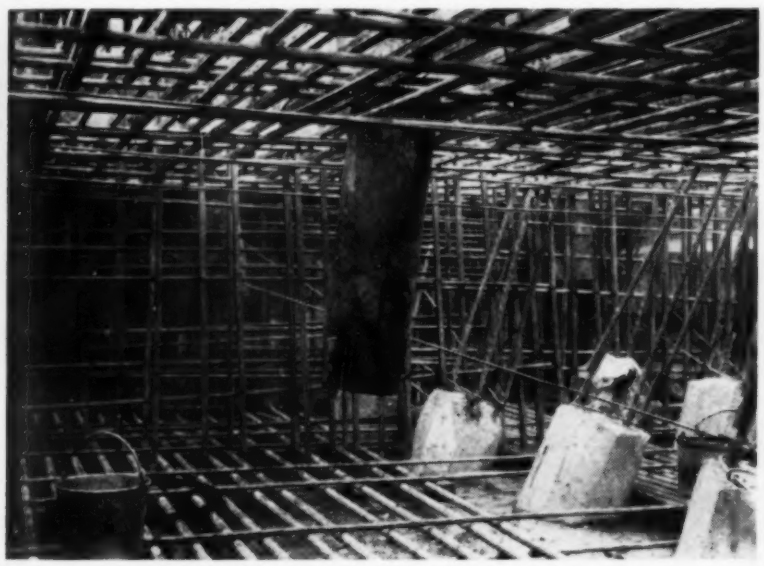
CONSTRUCTION DETAILS *For Superintendents and Foremen*

IN PACIFIC WAR THEATER lumber for construction by Navy's Seabees is obtained by felling trees and cutting them up with portable Disston chain saw powered by Mercury gasoline engine.

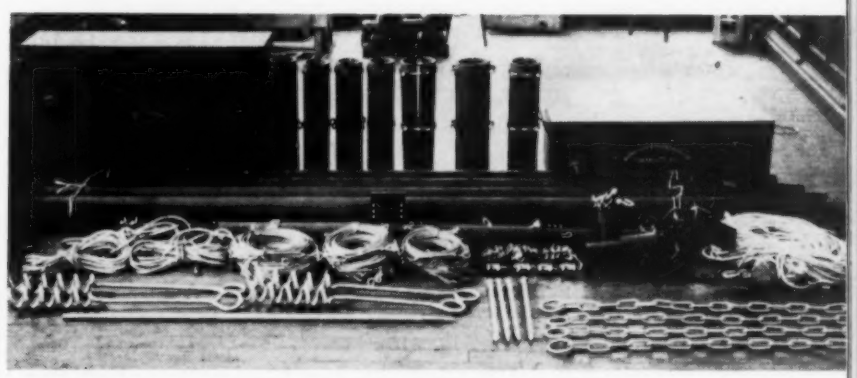
ALL-WELDED STEEL SHIPS (below) are rapidly moved from one way to another at Decatur, Ala., yards of Ingalls Shipbuilding Corp. Known as coasters, these cargo vessels are 258 ft. long and 42 ft. wide and draw about 7 ft., unloaded and without ballast. For transfer to next way, which takes about 90 min., ship is lifted 2½ in. off way with 12 hydraulic jacks. Jacks are on carts supported by flanged wheels running on railroad tracks.



TUNNEL ALONGSIDE SHASTA DAM is plugged with grout, as Sacramento River water which used tunnel to bypass dam will now be released to turn generators of Shasta power plant. First load of grout is poured into hopper of Pumpcrete machine (right) to be forced through 1,200-ft. tubes to tunnel plug.
U. S. Bureau of Reclamation Photo

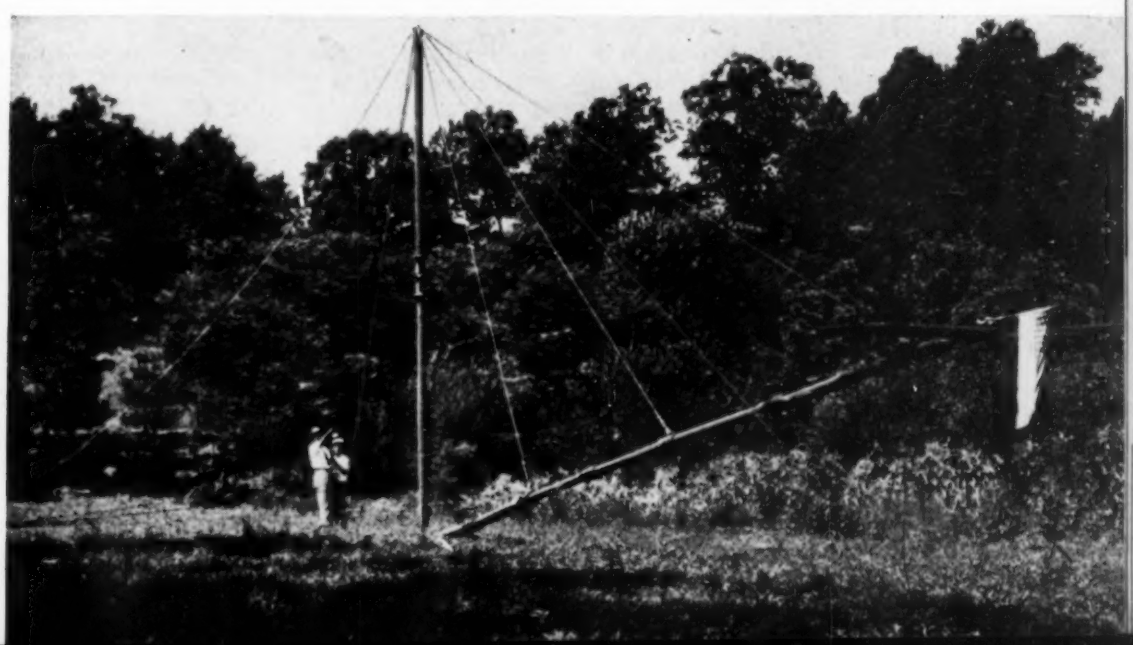


EXTENSION BARS (left) welded to dowel rods projecting from butts of cut-off concrete piles provide additional anchorage bond against uplift for footing slab under Mill Creek pumping station, Cincinnati, recently completed by LaCrosse Dredging Corp. and Ferd J. Robers Construction Co., contractors for U. S. Engineers (described in "Construction Methods," April, 1944). Reinforcing steel has been placed and lower end of flexible spout is in position to begin depositing footing slab concrete.



RUST AND SCALE are cleaned from San Francisco-Oakland Bay Bridge (below) by Osborn brush on a Stanley electric drill, prior to repainting. Brush (inset) is cup shaped, approximately 3¼ in. in diameter, heavily filled with coarse .020 S.A. wires which extend 15/16 in. out of cup. Operated in and driven by portable hand tool, brush spins at 4,200 rpm.

SECTIONAL ANTENNA MAST of tubular plywood is used by Air Forces for ground-to-plane radio communication. Devised by Signal Corps and supplied in two heights, 50 and 75 ft., it can be erected by three men and put in operation in 30 min. Units are shipped in three packages (above). Mast sections are strapped in one bundle weighing 152 lb. Guy wires and hardware are packed in box and weigh 121 lb. Wood chest carrying spare parts weighs 45 lb.
National Lumber Manufacturers Assn. Photos



THE NATIONAL DEBT—
and Your Postwar Job

Coming upon the heels of a ruinous ten-year depression, this war has once more made it clear to us that the strength of our country depends upon our ability and willingness to produce. Until the world conflict eclipsed the depression, we saw what failure to use our productive capacity can do—even to a country potentially as rich as ours.

The stark reality of war finally shocked us out of our economic lethargy. The necessity of supplying our Armed Forces with almost unlimited quantities of goods unleashed our inventive genius and revealed to us our real capacity to produce. It indicated what our standard of living might be if, in time of peace, we used our full productive capacity.

Today we are producing more than all the other nations combined, half again as much as in 1940. Today our production is insuring victory to our fighting men.

But what of the future?

Already our national debt has reached astronomical proportions, and it is going higher. The depression years' fear of insecurity that all but paralyzed our spirit of enterprise, our inventive genius, and our natural instinct for expansion, appears likely to return promptly if industrial activity again is curtailed for long because of unwise public policies.

This war is being fought to make men free. But our economy cannot be kept free through military conquest alone. There is another responsibility which we on the home front cannot avoid any more than we can build walls around our future. That is the problem created by our frightening public debt.

This is a two hundred billion dollar war. It affects the lives of every one of us. At the end of this war, the public debt of the United States will be at least ten times the twenty-five billion dollars that it was at the end of the first World War. It will be almost twice the present annual national income of the country. The interest charge alone will be about 4 per cent of the national income. If the burden were spread evenly, interest alone would take at least $80.00 of every worker's income per year, or approximately $1.60 out of each and every weekly pay check.

Some people fear that the heavy taxes required by the debt will keep the country poor by obstructing employment and limiting the output of goods.

Others believe that the size of the debt does not matter because we owe it to ourselves. They reason that if A is taxed $100 to pay $100 interest to B, A has $100 less to spend and B has $100 more, but both together have the same amount. They, therefore, hold that the demand for goods and the volume of employment remain unchanged.

Which view is correct?

Is our huge debt bound to be a crushing burden which limits employment and lowers the nation's standard of living, or will it simply redistribute income? May the public debt under certain conditions even be used to help increase employment and raise our living standards?

Most people, rich and poor alike, find it difficult to believe that the national debt "just does'nt matter". They know that the interest alone on this huge debt will be almost equal to the total amount of taxes ever raised before by the government for all purposes in any peacetime year. They find it difficult to follow the kind of reasoning that suggests increasing the already mammoth debt year by year in order to maintain full production and employment. They fail to see how this "debt raising" can go on indefinitely.

On the other hand, the records show that other nations have more than once successfully managed even greater debt burdens than will confront the United States after the present war. The interest on the British debt after the Napoleonic Wars was nearly 8 per cent of the national income, and after the first World War was over 7 per cent. But despite heavy taxes and some unfortunate mistakes in economic policy (such as restoring the prewar pound), per capita real income in Great Britain rose about 31 per cent between 1920 and 1929. In fact, it rose as rapidly as it did in the United States. The world depression was far less severe in Britain than it was in the United States; and by 1936, when industrial production still was 6 per cent below 1929 in the United States, it was nearly 16 per cent above 1929 in Britain. Britain's heavy debt burden proved less of a handicap to her during the depression than our weak banking system did to us.

Whether the debt becomes a crushing burden or whether we use it to further our progress depends upon who holds the debt and how the money is raised to pay the interest.

Here are the important possibilities:

1. If the expenses of the government, including the interest on the debt, are met largely by heavy taxes upon business profits—i.e., by taxes upon job-giving—then they will reduce employment, output, and our standard of living, regardless of who holds the debt. Heavy taxes on profits prevent enterprise from expanding current operations or enlarging the capacity of its plants, unless the prospects for profit seem certain and the prospects for loss are slim. Hence the jobs that might be created to take advantage of long chances will not come into existence, and the country as a whole will be poorer.
2. If the expenses of the government are met largely by stiff surtaxes upon the incomes of persons who do a considerable amount of saving, and the debt is, in the main, owned by millions of small investors, then the net effect of the debt upon the volume of employment and output will be fairly neutral. The stiff surtaxes, while reducing the savings of the well-to-do will cause them to avoid risky investments and to hold part of their savings of each year in the form of cash. This will limit the demand for goods and the volume of employment. But this effect will be partially offset if millions of small holders of the debt are led by their savings in government bonds to spend a larger part of their current income.
3. If the expenses of the government are met largely by sales taxes or other taxes on small incomes, and if the debt is held largely by the well-to-do or by business corporations, then the effect of the debt will be unfavorable to employment and production. The limitation to the spending power of the small-income group will reduce the volume of investment opportunities, and the transfer of income to the well-to-do will increase the volume of investment-seeking funds.
4. If the debt is widely distributed among millions of small holders, and the expenses of the government are met largely by taxes on individuals, if substantial exemptions from surtaxes are given for all income invested in new plant or equipment, and if there are liberal offsets for losses, then the debt will help increase employment and raise the standard of living. The millions of small holders will gain a sense of security from their accumulated savings and hence be encouraged to spend a larger portion of their current incomes. The stiff surtaxes will reduce the savings of the well-to-do; liberal exemptions for income put into new plant and equipment, and generous treatment of losses, will cause the well-to-do to invest their savings in job-giving enterprise rather than to hold them in idle cash.

But what is the situation today?

Today, non-banking corporations own nearly half of the Federal debt, commercial banks about one-fourth, and individuals less than one-fourth. Not more, and probably less, than one-tenth of the debt is held by persons earning less than $5,000—although these persons receive three-fourths of all income.

Today, about half of the revenues of the Federal government come largely from taxes which must be regarded as *taxes upon the creation of new jobs*. If these conditions

continue, we may be sure that the debt will be a disastrous obstacle to a rising standard of living after the war.

What can be done to change this situation?

To begin with, vigorous steps should be taken to get much more of the debt into the hands of individuals, particularly of those in the small-income group. During the last three years, the incomes of individuals, after taxes, have exceeded the supply of consumer goods by $74.2 billion. In other words, individuals have been compelled, by the sheer scarcity of goods, to save over $74 billion. Of this amount, only $27.4 billion, or 37 cents out of every dollar, has gone into government bonds. Indeed, individuals have saved more in the form of cash and bank deposits than in the form of government bonds. The sale of war bonds to individuals was most disappointing in the recent drive. It was so disappointing, in fact, that I would favor a special drive *for individuals only,* to be scheduled before the next general drive. During 1944, when the supplies of civilian goods are severely restricted and when the fighting is at its climax, the Treasury will have its best opportunity to persuade individuals to buy more bonds. This opportunity should not be lost. An increase of at least twenty-five billion should be the goal for the next year. Every citizen should be made to understand that by buying war bonds now, he is not only helping to win the war; he is helping to make possible a more prosperous and stable America after the war.

The efforts to sell bonds to individuals should be vigorously continued throughout the shift from war production to civilian production. During this period, corporations which, up to now, have been the largest buyers of government bonds, will need all their depreciation allowances and undistributed profits to pay for new equipment and to restore their own dealers' inventories. The government, however, will still have large bills to settle and will need to sell as many bonds as it can for some months after the end of hostilities. During this period, the demand for most types of goods is likely to exceed the immediate productive capacity of industry. Hence, the sale of bonds by the government will make for economic stability.

The huge expenses, including interest on the debt, which the government must meet after the war, require that the tax system be drastically reformed. Today, taxes fall most heavily upon those incomes which are the reward for increasing production and employment, because profits are taxed first as corporate profits, and taxed again as dividends to owners of the corporation. Surtaxes are so stiff and offsets for losses so meager that the well-to-do capitalists cannot afford to encourage and help promising young businessmen to start new enterprises.

A nation whose expenses are as large as those of the United States will be after the war must be sure that its tax system provides incentives, not penalties, for increasing production and employment.

Should the debt be repaid? Some people fear that any reduction of the debt would have a deflationary effect and cause unemployment. An opposite view was expressed by Mr. Morgenthau recently: "We have a big public debt that must be paid off, and the quicker we do that the better." Both of these views are extreme. Repayment of part of the debt during a period of depression would increase unemployment. Every period of high prosperity, however, would give the government an opportunity to pay off part of the debt without limiting employment. During these periods of prosperity, business corporations will sell government bonds in order to buy equipment; and many individuals will redeem war savings bonds in order to purchase houses, automobiles, and other goods. If the government budget runs a surplus during periods of high prosperity, and if this surplus is used to retire some of the bonds sold by corporations or redeemed by individuals, the country will be protected against a disorderly and speculative rise in prices. Thus, reduction of the debt can be made a device for stabilizing our economy.

There are two other reasons why reduction of the debt will be desirable.

In the first place, it will help prepare the country financially for a possible third World War. Determined as we are that this war shall be the last one, common sense tells us not to count on this. At any rate, we must be prepared for any eventuality.

In the second place, gradual reduction of the debt would stimulate employment by creating the expectation of lower taxes. It is not generally appreciated how much the willingness of individuals and business concerns to spend money is affected by the prospects of higher or lower taxes. One of the best ways to make individuals and enterprises spend more freely is to convince them that taxes will become a little lower, year by year.

Many people have difficulty visualizing the day when there will be a substantial reduction in the burden of the national debt. And yet, if the country pursues wise economic policies, there is no reason why the debt burden should not be cut in half during the next generation.

The days of technological progress and economic expansion are not over. They are, in fact, only well begun. During the Twenties, the national income in dollars of constant purchasing power increased by well over 50 per cent. Between 1929 and 1939, it increased by less than 6 per cent. Perhaps the rate of the Twenties cannot be maintained indefinitely; but scientific research and development work in industry are laying the foundation for very large advances in national income. Suppose that the national income increases 33 per cent in the first decade after fighting stops (say hopefully, 1945), 25 per cent in the next decade, and thereafter at the rate of 20 per cent a decade. In 1955, the national income (at present prices) would be about $173 billion; in 1965, about $216 billion; and in 1975, about $257 billion. By 1970, the burden of the debt would be reduced by nearly half, even if not a cent of it were repaid!

A huge public debt is a test of the character, the common sense, the foresight, and the equally important technical and engineering skill of a nation. *It requires that tens of millions of small income earners be willing to become substantial holders of the debt. It requires that the nation be willing to tax itself heavily, but in ways which increase the attractiveness of job-giving or self-employment relative to job-holding; it requires that the nation be willing to pursue policies of expansion and to put a rising income for the nation ahead of the pleas of self-seeking groups in labor, agriculture, and industry.*

A huge debt may so draw out the hidden powers of a people that it makes the nation wealthier rather than poorer, stronger rather than weaker.

Up to now, Americans have not met the test of a big public debt too well. Individuals have saved more in cash than in government bonds, and the country has shown little interest in avoiding the kind of taxes that reduce the demand for labor. These shortcomings, I am sure, stem largely from the fact that the American people never have had the problems of debt and taxation honestly and adequately explained to them.

I have confidence in the American people. I believe that Americans have the intelligence to understand this problem of the public debt, the character to face their responsibility regarding it, and the common sense to accept the challenge and make the most of it.

President, McGraw-Hill Publishing Company, Inc.

British Combine Photo

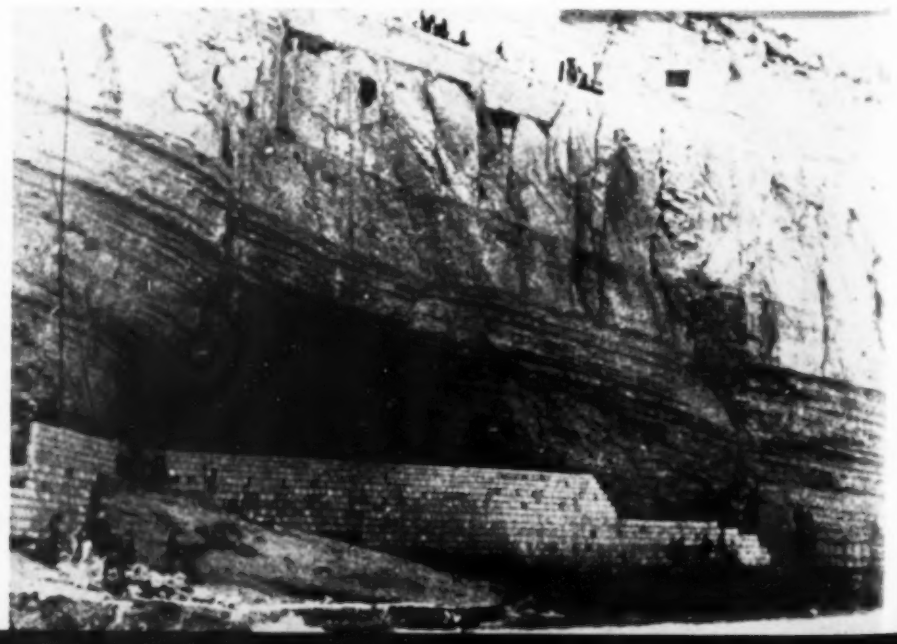
RAILS ARE LAID on sleepers for desert railway track by New Zealanders and men of Indian Corps.

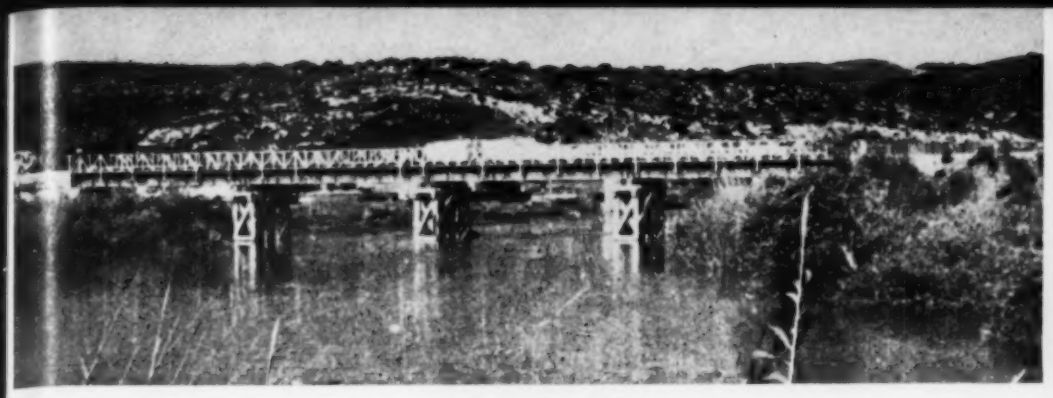
Standard-Gage Railroad

LAST LINK in the through standard-gage railroad route between London and Cairo was forged when South African and Australian military engineers—also New Zealanders during the final stages of the project—completed the Haifa-Beirut-Tripoli Railway in 1942. After the Allied occupation of Syria in July 1941, it was decided for military purposes to construct a standard gage connection along the eastern shore of the Mediterranean Sea between Haifa and Tripoli, hitherto served only by a narrow-gage (105-cm.) railroad following a circuitous inland course.

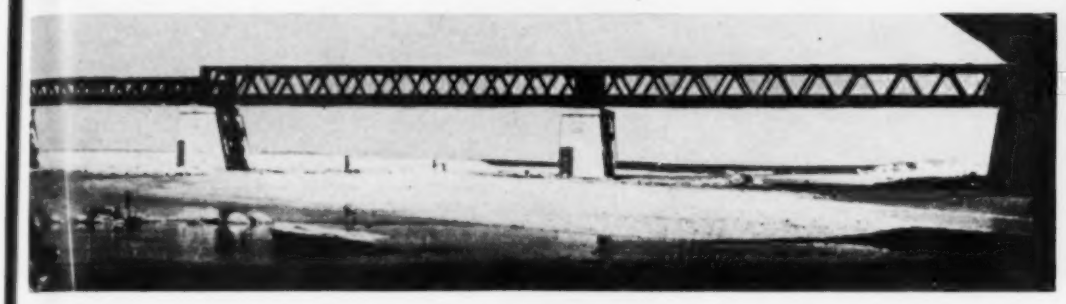
REINFORCEMENT is constructed for 4,823-ft. tunnel through Ras Chekka headland near Tripoli.

RETAINING WALL is built on coastal section of Haifa-Beirut-Tripoli Railway, which entailed long stretches of heavy earthwork.





FOUR 40-FT. SPANS carry railway across Litani River, with 12x12-in. timber piling driven to between 50 and 60 ft. below bed level. Abutments are of concrete or gravel.



NAHR EL KELB BRIDGE consists of one 70-ft. through-span and two 100-ft. lattice girder through-spans. Masonry was used throughout on superstructure as outside finish and took place of formwork for concrete cores of piers and abutments. Steelwork was erected on falsework.

STEEL SHEETPILING in 20-ft. lengths protects two south piers of Damour River Bridge. This was driven after first winter's floods when it was noticed that much scour had taken place. Intervening space is filled with concrete. Piers are 14 to 20 ft. deep.

COMMEMORATIVE TABLET is unveiled to celebrate completion of line. Reading it are Australian "digger" and Lebanese soldier. British Combine Photo

SILVER SPIKE is driven by GENERAL SIR HAROLD ALEXANDER, commander-in-chief of British Military Engineer forces, to complete Haifa-Beirut-Tripoli Railway. British Combine Photo

ON BEIRUT-TRIPOLI SECTION of line (below) is this Australian-built culvert. Wadi in background shows type of country through which line was laid. British Combine Photo

By LT. COL. I. P. TOOLEY

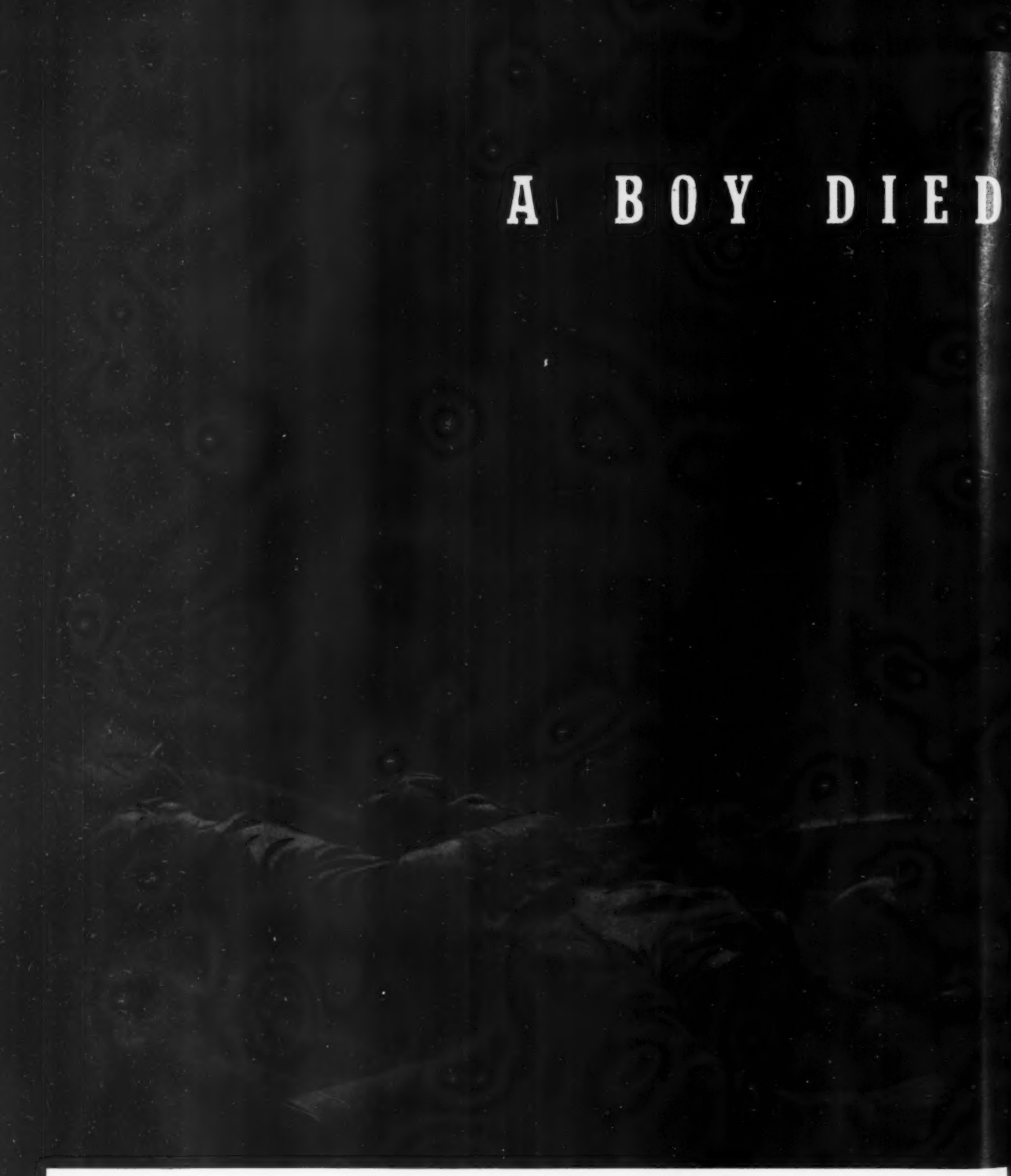
British Army

Surveys revealed that the only route practicable in the time allowed would have to follow the coastline all the way—120 mi.—and although part of the line traversed flat cultivated country, it entailed also long stretches of heavy earthwork, rock excavation, bridging and tunnelling in negotiating rocky limestone cliffs and headlands. Some idea of the construction difficulties ahead was foreseen when the advance parties often had to resort to mountaineering methods and the use of boats in order to survey some of the headlands.

The construction of earthwork, particularly on cultivated land, was considerably hampered by the winter rains and waterlogged ground. Work began with local

(*Continued on page* 150)

A BOY DIED L



HOW TO HELP WIN THE VICTORY.... AND PEACE!

- Place idle equipment in essential industries
- Make your machines last by keeping them repaired
- Urge completion of plans for postwar projects
- Help plan jobs for returning service men

D LAST NIGHT..

A BOY died last night. It doesn't make much difference now about his name. It might have been your son, your brother, your husband. The important thing is that he died, in poignant and awful loneliness out somewhere on a waste of sand, out in a starless silence, 10,000 miles from home.

"Missing in action" read an obscure line in this morning's communique. That was all. Now he lies there, a crumpled, twisted mass of flesh, that yesterday was his body. The fine head and the shining face and the broad shoulders remain only in a picture that looks out upon a quiet living-room on a shaded street an eternity away.

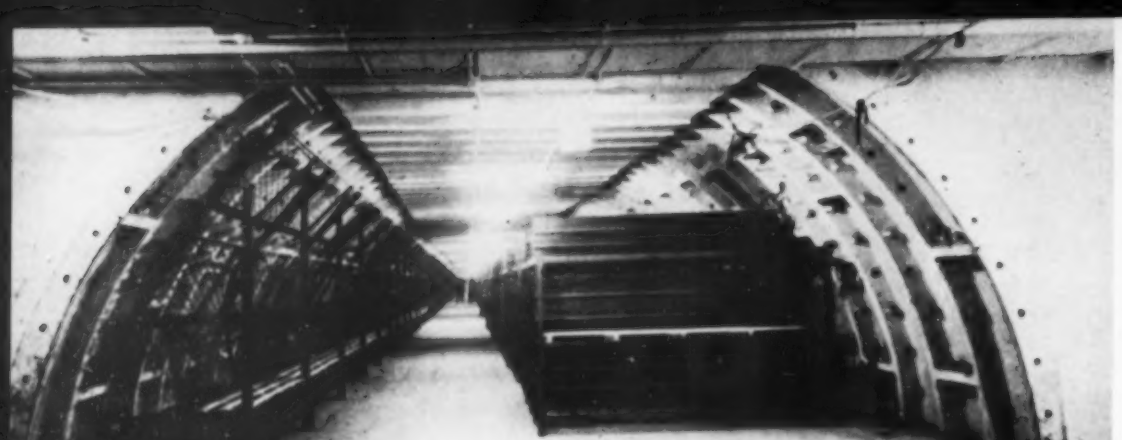
Last night, in those agonizing hours of unspeakable isolation, he went through a thousand deaths without the one thing that might have helped a little — the sound of a familiar voice, the pat of a friendly hand. Many people died last night in their beds at home, surrounded by those who cared. Last night he died in utter desolation in an unimaginable loneliness.

The pain was terrible enough. But then there had to be that dreadful burden of thought in those endless last hours. Mom and Pop. The flowers blooming again in the backyard. The good old roadster in the driveway. That last sweetheart kiss at the station. Those dances last summer. That half-finished letter in his blouse. All those plans for the future. Couldn't somebody find him, please? The wracking pain again.

Too much for you, all this? But it really happened last night, just like that. It's going to happen a thousand times — ten thousand times, and perhaps a million times in the nights to come. If people could only understand it. If they would just grind deep into their thinking the stark, terrible reality of it, every petty, selfish interest would be swept away. They would sacrifice anything and everything just to make themselves worthy of that boy.

He died last night, you see. There's no way to get around that.

— John H. Hoagland in the Louisville Courier-Journal



UPPER AND LOWER floors (above and below) of deep tunnel shelter are equipped with benches and sleeping bunks and are well lighted and ventilated.

London's Tunnel Shelters

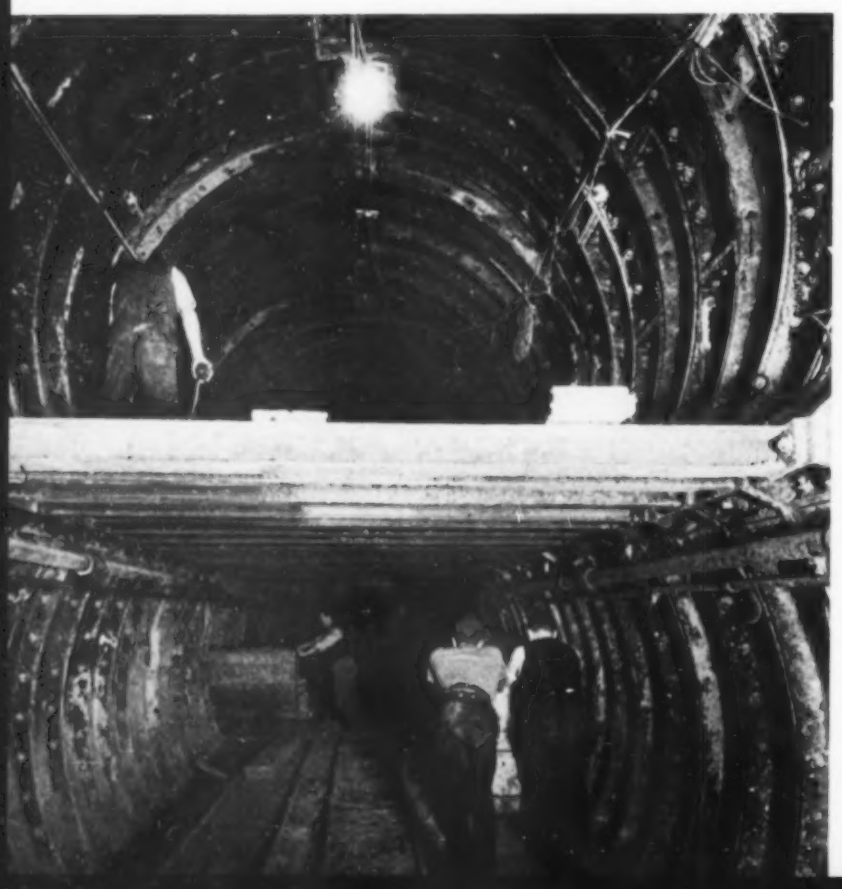
FOR AIR-RAID PROTECTION

Will Serve as Post-War Subway Tubes

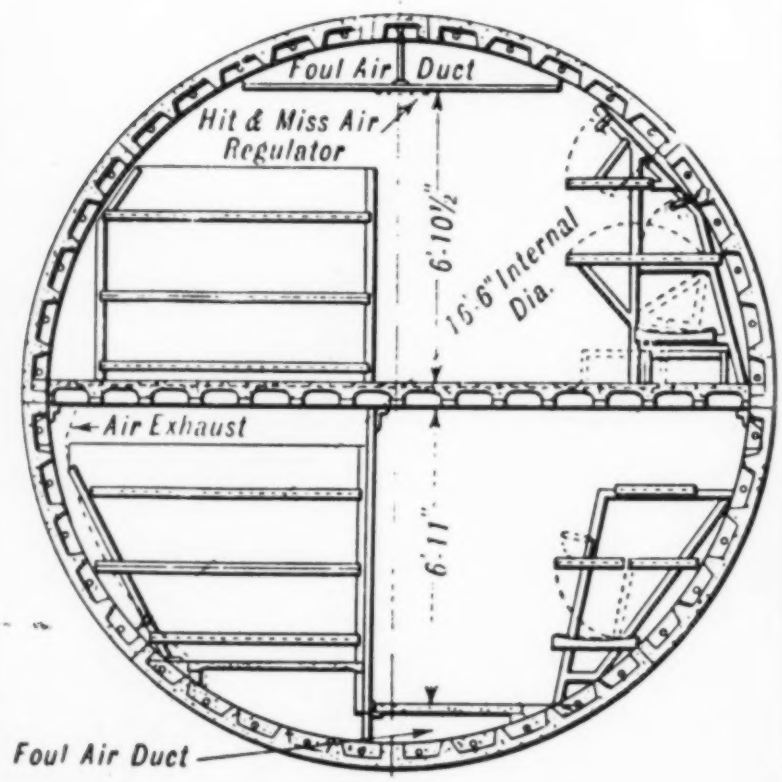
By S. P. KERNAHAN

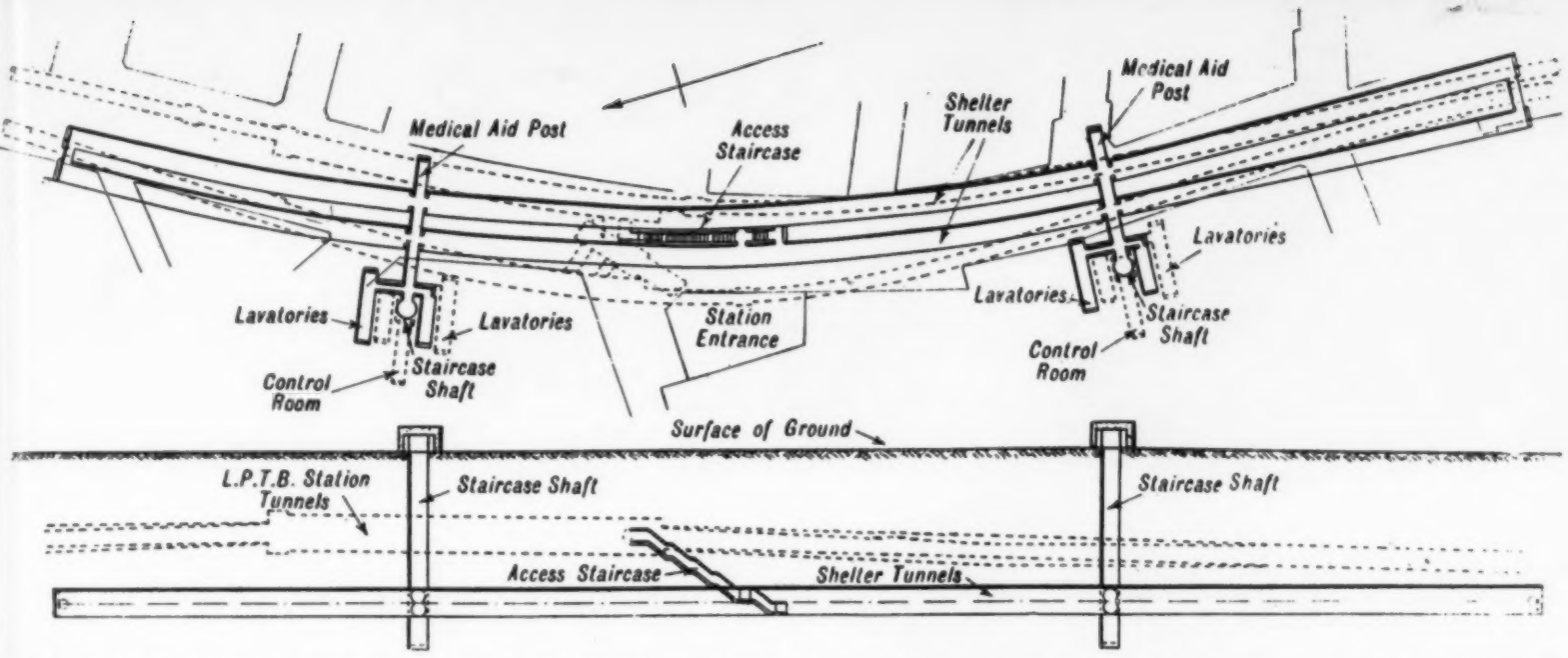
TO SERVE A DUAL PURPOSE—air-raid shelter for British civilians for the duration of the war and express subway tubes after hostilities end—eight sections of 16½-ft. dia. tunnel, each from 1,200 to 1,400 ft. long, have been built from the bottoms of shafts deep below the street surface alongside existing stations of London's undergound railway system. These tunnel shelters, which are lined for the

DOUBLE DECKER TYPE of construction (below) is lined with segmental metal rings bolted together. Transverse beams at mid-section provide support for upper floor.



CROSS-SECTION OF TUNNEL SHELTER 16½ ft. in internal diameter (below) shows segmental precast concrete block lining and floor at center of bore.





TYPICAL PLAN AND CROSS-SECTION of one of the eight London tunnel shelters which are from 1,200 to 1,400 ft. long and are driven from shafts near existing stations and parallel to existing underground railway lines.

most part with rings of segmental precast concrete blocks, provide almost complete protection from enemy air attack and are equipped with ventilation, sleeping, feeding and sanitary facilities for many thousands of people. After the war the tunnel shelters will be incorporated in the proposed north-south express tubes to be constructed parallel to the existing lines of London's underground railways.

The greater part of London's extensive underground railway system is at least 30 yr. old. Construction costs of the few extensions built in recent years have been nearly four times greater than the original costs, both for labor and material. It is this factor which has hindered the extension of a transport system otherwise suitable for a city in which obstacles in the way of new traffic arteries

(*Continued on page* 142)

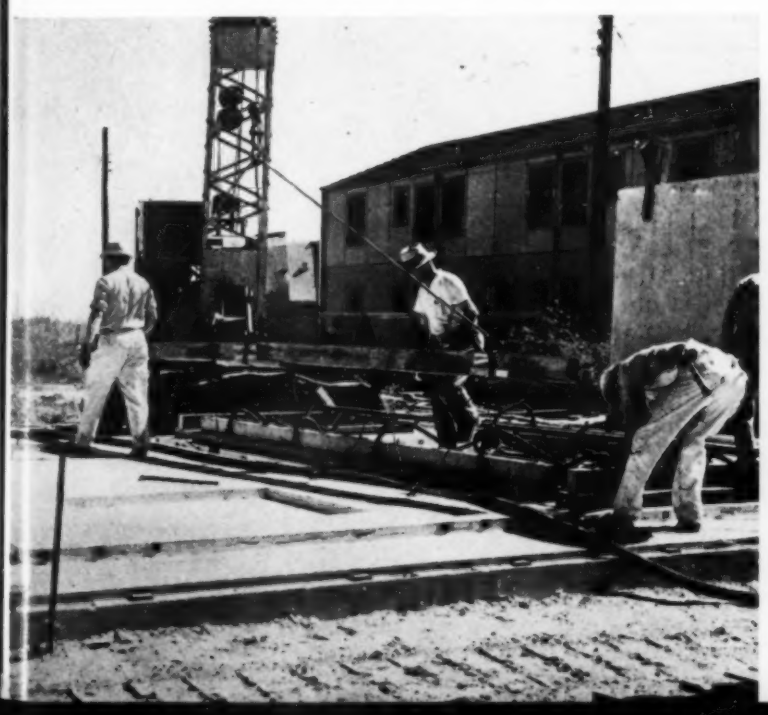
Precast Concrete Walls

With Prestressed Reinforcing Rods

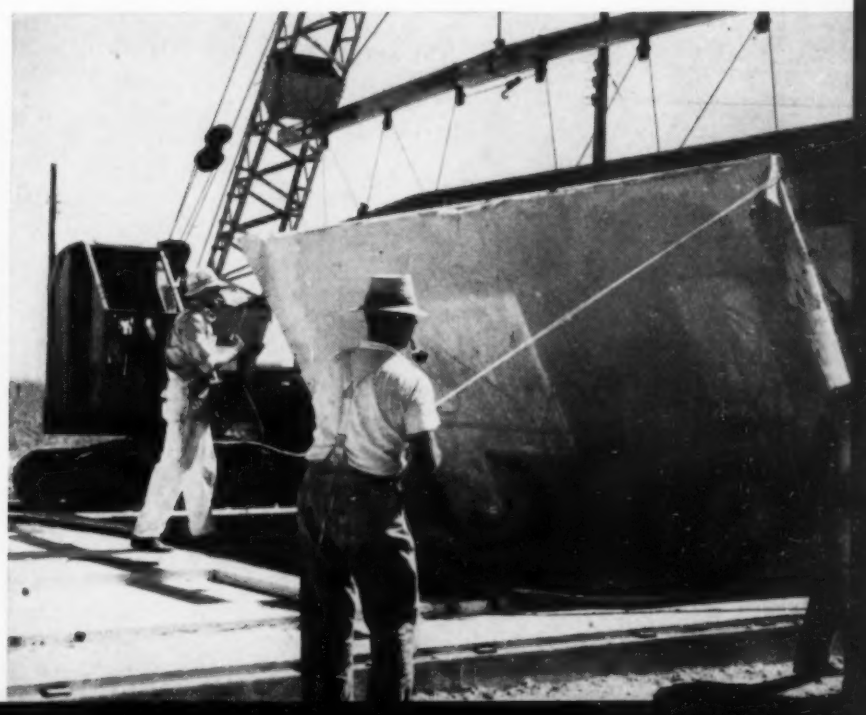
Used for Housing

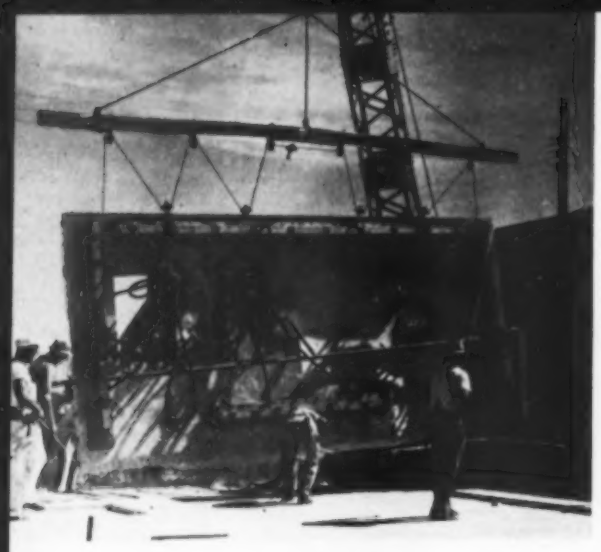
HOMES FOR SHIPYARD WORKERS at the U. S. Maritime Commission's housing project in Tampa, Fla., have been built with precast vacuum-processed concrete wall sections, reinforced with prestressed steel rods. The 2½-in.-thick walls were precast two at a time on canvas stretched over the concrete floor of each one-story house. Edge forms of 2½-in. angle iron were put in to define the shape of the

VACUUM CUPS (below) built into T-beams and attached to lifting lines from crawler crane are placed on flat surface of precast concrete wall section at evenly spaced points along its length to permit lifting without strain.

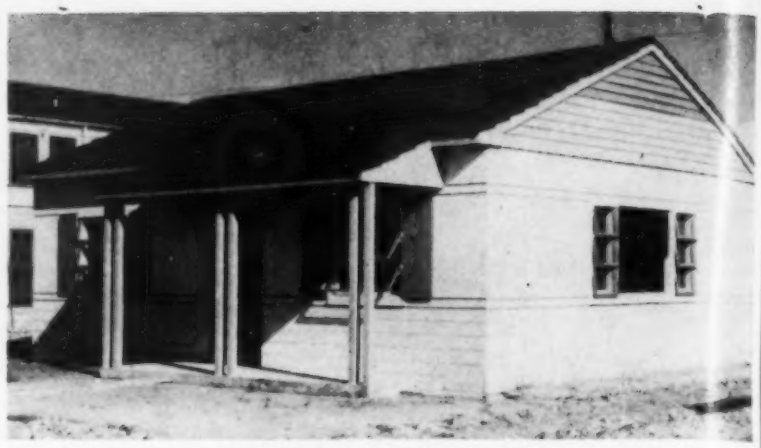


CANVAS (below) on which concrete was cast is still in place as wall is raised to vertical position.





CRAWLER CRANE (left) lifts precast concrete wall section into vertical position.



SINGLE-UNIT DWELLING (right) is completed by precast method. Note shallow, horizontal rustication lines which were cast in wall to enhance exterior appearance.

walls and the door and window openings. Shallow horizontal rustications were cast in the wall face to enhance the exterior appearance.

Reinforcing steel consisted of ⅜-in. smooth round rods. After curing for 4 days, the wall sections were lifted into a vertical position with a crawler crane. Lifting lines were attached by means of a row of vacuum cups built into T-beams. These cups gripped the flat surface of the wall at evenly spaced points along its length, permitting lifting without straining any part of the wall.

A ½-in.-thick layer of concrete, 1 part white portland cement and 2 parts sand, was first spread on the canvas. On this a 2-in. layer of 1:2:3 concrete, made with normal portland cement and ⅝-in. gravel, was placed before the bottom layer had set.

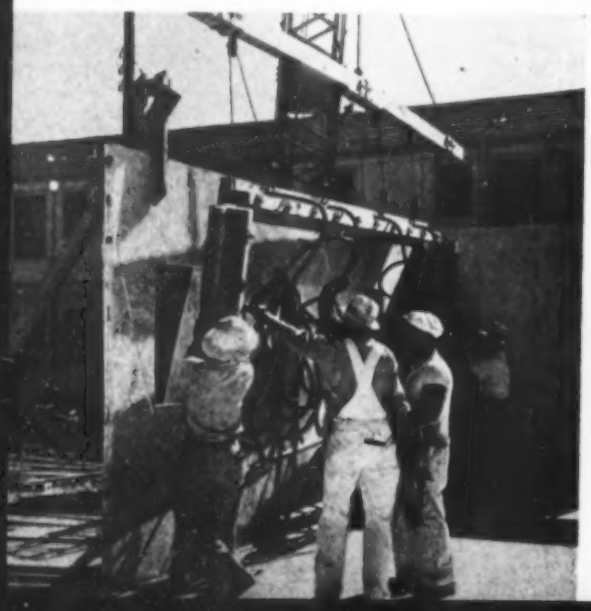
The reinforcing rods were prestressed shortly before the walls were lifted into vertical position. Bars threaded at each end were coated with a thermoplastic material and placed in the usual manner. After the concrete hardened, low-voltage current was passed through the reinforcing bars to heat them to about 250 deg. F. above the temperature of the surrounding material. The nuts at the threaded ends were taken up a computed amount. Cooling of the thermoplastic restored the concrete bond. Patents on vacuum concrete and electric prestressing of reinforcing rods are held by Vacuum Concrete, Inc., of Philadelphia, Pa.

In some of the houses ends of walls were mitered, grouted together and secured with angle irons. In others, corners were cast together in forms. Interior walls were finished with wall board nailed to furring strips which were placed on the top face of the wall section just after the concrete was vacuum-processed. Flooring is asphalt tile over concrete subfloor.

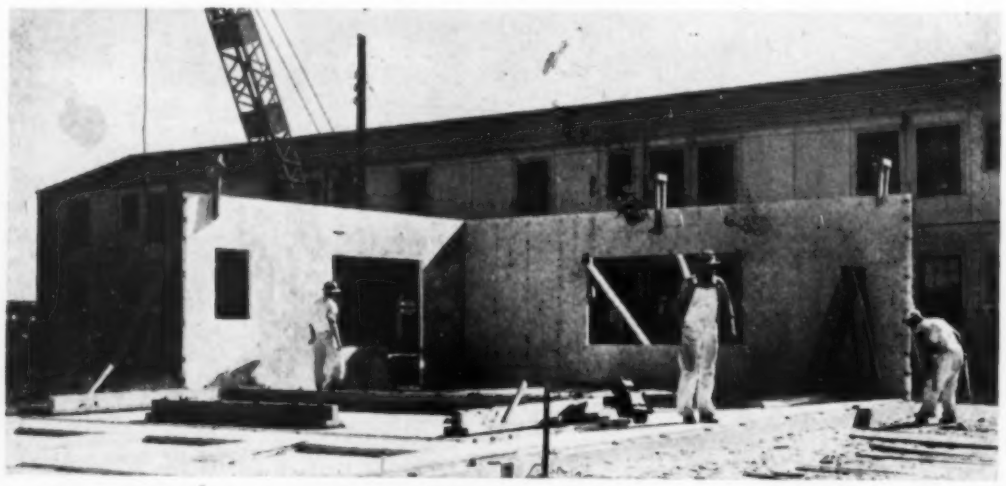
Construction was directed by H. T. Underwood, architect and chief of housing for the Gulf Coast Regional Office of the U. S. Maritime Commission at New Orleans, La. Plans were prepared by Leo Elliott, Tampa. Contractor was J. A. Jones Construction Co., of Charlotte, N. C.

PRECAST CONCRETE WALL is swung into position next to adjoining section and corners (right) are bolted.

VACUUM ATTACHMENTS (below) are removed after wall is in place.



TWO WALL SECTIONS (below) are up, while another is still flat on floor.



8 *hidden taxes that you can vote down*

CYLINDER WEAR is a heavy tax that has always been paid on engine operation. It costs money, not only because it reduces efficiency, but also because it means shut-downs eventually.

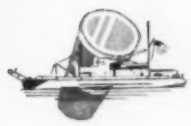
You can expect four to twenty times longer trouble-free service from engines whose cylinder bores have been treated with PORUS-KROME.

PORUS-KROME has incomparably greater resistance to wear and corrosion than any other cylinder surface. Produced by the Van der Horst process, it is hard chromium which has tiny pores or pockets that act as oil reservoirs.

Experience in Europe and America in thousands of engines . . . aircraft, automotive, marine, and stationary, both Diesel and gasoline . . . has proved that PORUS-KROME multiplies cylinder life and reduces scuffing, ring feathering and risk of piston seizure.

Whether you are a builder or user of engines, here is a money value that you can measure in additional engine life.

The Van der Horst Corporation has three plants where PORUS-KROME is being applied to vital engine parts. Engine and parts manufacturers may also obtain licenses to use the process in their own plants. Our engineering services are available to those who are interested in PORUS-KROME for commercial application.



VAN DER HORST

PORUS - KROME

Good for the Life of your Engines

VAN DER HORST CORPORATION OF AMERICA

AN AFFILIATE OF DRESSER INDUSTRIES

OLEAN • NEW YORK
CLEVELAND 11 • OHIO

Present and Accounted For

ERECTION WORK on refineries in Caribbean area is being done by company set up under laws of Curacao, Netherlands, West Indies, by Bechtel-McCone-Parsons Corp. and Raymond Concrete Pile Co. Executive force includes (left to right, kneeling) M. D. ROGERS, assistant managing director and general superintendent; H. A. LUTZ, managing director; F. A. McDERMOTT, assistant managing director and office manager; (standing) M. J. HINKLEY, office engineer; STANLEY SQUIRES, head of accounts; and G. E. BUCHANAN, assistant general superintendent.

ELECTED PRESIDENT of Carolinas Branch, Associated General Contractors, is C. P. STREET, of Charlotte, N. C. He took office at organization's annual meeting at Pinehurst, which featured post-war planning for public construction.

INSTALLED AS PRESIDENT of Society of American Military Engineers is VICE ADMIRAL RANDOLPH WAESCHE, commandant of U. S. Coast Guard, who succeeded Frederick H. Fowler, chief consulting engineer in office of Chief of Engineers, U. S. Army. Society now has 25,907 members.

SERVING SECOND TERM as president of Associated General Contractors of Minnesota is W. M. CEDERSTRAND (left), who was reelected at organization's 25th anniversary meeting. He is president-treasurer of August Cederstrand Co., of Minneapolis.

HEADING MOUNTAIN PACIFIC CHAPTER, Associated General Contractors of America, is E. J. WHITE (right). Member of firm of MacRae Bros., of Seattle, Wash., he has been active in heavy construction work in Pacific Northwest for last 8 yr.

NEW PRESIDENT of Central Branch (Iowa), Associated General Contractors, is E. B. SPENCER (below), head of E. B. Spencer Construction Co. of Waterloo, which is engaged in sewer and waterworks construction in Iowa, Illinois and Nebraska and has completed two war projects.

PLANNING COMMITTEE of American Public Works Association is headed by MICHAEL BAKER, JR. (below), of The Baker Engineers, Rochester, Pa., which is now doing engineering design and survey work on $20,000,000 Penn-Lincoln Parkway in Pittsburgh.

NEW PRESIDENT of Metropolitan Section (New York), American Society of Civil Engineers, is WILLIAM McK. GRIFFIN (below), deputy chief engineer, New York City Tunnel Authority. Mr. Griffin served as assistant engineer on construction of East River tunnels of Pennsylvania R.R.

PAGE OF PERSONALITIES

ORDER OF THE BRITISH EMPIRE is pinned on COLONEL C. H. BONESTEEL (right) of U. S. Army Engineers by GENERAL SIR BERNARD MONTGOMERY. Colonel Bonesteel was decorated for distinguished services in Tunisian campaign. British Combine Photo

AWARDS OF MERIT are presented to two U. S. Bureau of Reclamation assistant engineers who developed improved process for coloring maps. Here R. S. CALLAND (left), assistant regional director at Sacramento, presents award to ALSTON R. ZRYD, while JOHN A. GILMONT receives his from CHARLES E. CAREY (right), regional director.

BOEING FIELD IMPROVEMENTS, which will cost $1,644,658, were begun at Seattle, Wash., July 4 by N. Fiorito Co., local contracting firm. Members of firm are shown (right) with MAJOR LEONARD BINDON, C. E., assistant chief operations division, Seattle Engineer District, U. S. Army. They are (left to right): DAN FIORITO, MAJOR BINDON, N. FIORITO, and PAUL FIORITO.

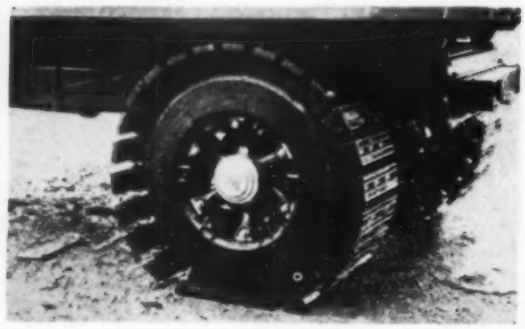
APPOINTED DIRECTOR of Construction Division, Petroleum Administration for War, is GEORGE GIBSON (left), former assistant director. Before joining PAW staff in 1941 as refinery materials expert, he was refinery technologist and consultant of Hancock Oil Co. in Long Beach, Calif.

DIRECTING ACTIVITIES (below) of The Producers' Council, Inc., are (left to right): DOUGLAS WHITLOCK, of Structural Clay Products Institute, Washington, D. C., president; J. W. FOLLIN, managing director; and RUSSELL G. CREVI STON, of Crane Co., Chicago, general chairman, Post-War Committee. Headquarters for this organization of manufacturers of building materials and equipment are at Washington.

CONSTRUCTION EQUIPMENT NEWS

AUGUST, 1944 REVIEW of Construction Machinery and Materials

CRAWLER-TYPE WHEEL known as "Flat Wheel" and manufactured in capacities up to 20,000 lb., for use on trucks, tractors, cranes, trailers, hand-drawn hoists, pavers and wheelbarrows, is o fall-metal construction with all wearing parts hardened to provide long life. It has no bearings or other parts requiring lubrication nor any springs or other complicated mechanism. Low rolling resistance enables it to run at speeds up to 40 mph. on motor trucks. Readily interchangeable with standard wheel or



tire rim equipment. Length of flat projected on ground is governed largely by diameter of wheel. Width of tread optional. On approaching an obstacle, Flat Wheel forms its own incline, cushioning the shock. When used on a wheelbarrow, ground pressure is reduced, permitting operation on soft terrain without use of board runways.—**Henneuse Engineering Co., Marion, Ohio.**

★ ★ ★

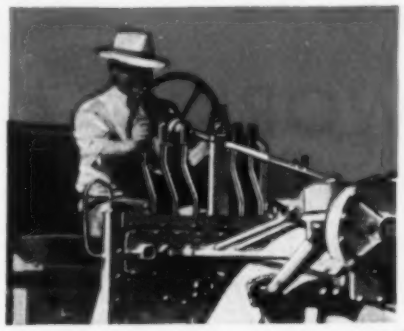
TWO-WHEEL HAULING SCOOP, rear-dump type, single-cable-controlled, in 3-, 5- and 8-cu. yd. capacities, is designed to load quickly with minimum power consumption and has a bowl which pivots and dumps behind the wheels, permitting discharging over banks in bridge and culvert work. Load may be dumped while moving forward, backward or in a stationary position. Controlled spreading feature insures accurate placing of load, as desired. Equipped with two oversize tires. Easily maneuvered in tight places. Economical features and adaptability make it of especial interest to state, city and county highway departments, as well as to contractors.—**Southwest Welding & Manufacturing Co., 3201 West Mission Road, Alhambra, Calif.**

★ ★ ★

COMBINATION ETCHER AND DEMAGNETIZER, ready for instant use in either capacity, has fourteen heats (Lo—90, 150, 200, 250, 350, 450, 600; Hi—300, 400, 500, 650, 850, 1100, 1350 watts), is provided by a "Hi-Lo" tap and seven-point switch. This gives a wide range for making all iron, steel

and their alloys from small delicate parts up to large smooth castings. When using ground clamp to etch large parts, the "keeper" must be removed from front of case and placed on workplate across transformer poles. An indicating lamp glows brighter as each higher heat is used. To demagnetize, switch must be turned on to either No. 1 or No. 2 position and then procedure is same as with ordinary demagnetizer. Maximum rating is 5.5 amp. Overall pole area, 13½ sq. in. Specifications: overall dimensions, 8¼x11½x8⅝ in. Size of work plate, 8¾x7¾ in. Includes 5-ft primary cord and plug, heat-resisting etching tool with 5-ft. lead, extra point, ground clamp and 4-ft. lead. Weight, 39 lb.—**The Ideal Commutator Dresser Co., 4102 Park Ave., Sycamore, Ill.**

YOU GET *Speedy and Positive Controls* ON ADAMS MOTOR GRADERS



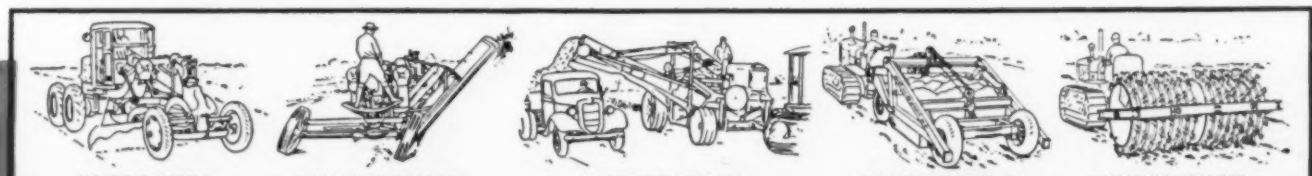
One of a series of ads on Adams motor grader features

EXPERIENCED grader operators—particularly those on construction work where frequent blade adjustments are necessary—want positive, dependable controls. When they operate their control levers they want to know what's going to happen and how fast . . . When you lower the blade on an Adams, it goes down at a constant, set speed and when you raise the blade it comes up at the same constant speed. The same positive action applies to the scarifier and leaning of the front wheels. And, with Adams mechanical controls you can operate two or more controls at the same time without affecting the set speed of any of them . . .

Positive acting controls are essential on fine work, such as the blading of black top on the contract job pictured above, but they are advantageous also on all types of grading and road maintenance. You want them and should have them whether you are contractor or highway official, so be sure of getting them by buying Adams . . . Not only are Adams controls positive and dependable in their action but they are speedy and easy to operate.

J. D. ADAMS COMPANY · INDIANAPOLIS, IND.

At war's end we'll need many new roads and many jobs for returning service men. Plan post war projects now and meet both needs.



ADAMS ☆ ROAD-BUILDING AND EARTH-MOVING EQUIPMENT ☆

★ THE FIRST

SEAMAN MIXER

BUILT FOR HIGHWAY WORK

Is Still Faithfully Serving

TODAY!

We're going to let the words of Mr. Perry Worden, Highway Commissioner of Portage County, Wisconsin, tell the story:

"The Portage County Highway Commission bought its first Seaman Pulvi-Mixer even before the start of my administration as Highway Commissioner. That Seaman Mixer was the first one in the country specifically used for highway construction and we're rather proud of the fact that Portage County pioneered with Seaman.

We've used the Seaman Mixer year in and year out ever since. In black top work, we operate the Seaman on the windrow between two motor graders, and the in-place mixing time has been so sharply reduced that the graders have many more hours available for maintenance and repair of other roads. Not only that, — but we get a better and more uniform mix, with a consequent saving in oil. 'Lean' and 'rich' spots have been eliminated and 'bleeding' with its consequent traffic hazard is unknown.

Another important use for the Seaman Mixer, — and one which I believe originated in Portage County, — is in shoulder maintenance and ditch clearing. We send the Seaman in after our motor graders have stripped the sod and brush, to pulverize the lumps and reduce the material so that it can be spread. This has eliminated the undesirable practice of leaving clods on the highway to be reduced by passing traffic."

A snapshot of the original Seaman Pulvi-Mixer (tractor-operated) — the first unit ever used in highway construction, working on a Portage County (Wis.) highway, pulverizing asphalt prior to remixing.

. . . Today, Portage County has another Pulvi-Mixer at work in conjunction with the "old timer" that has already given so many years of service.

One of the most popular handbooks in the highway field, the 1944 edition of "Soil Stabilization Methods", compiled by Seaman Engineers, is ready. Ask for Bulletin M-24.

MODEL MHD-72

SEAMAN MOTORS
MILWAUKEE, WIS.

"EVERY SOIL STABILIZATION JOB NEEDS A SEAMAN"

Upson-Walton Specifications for Steel Wire have Never been relaxed!

BACK in 1916, when Upson-Walton first began to manufacture wire rope, we set up rigorous standards which every foot of steel wire we use must measure up to.

Those standards have never been lowered. Even material shortages in these war years have not been allowed to influence them.

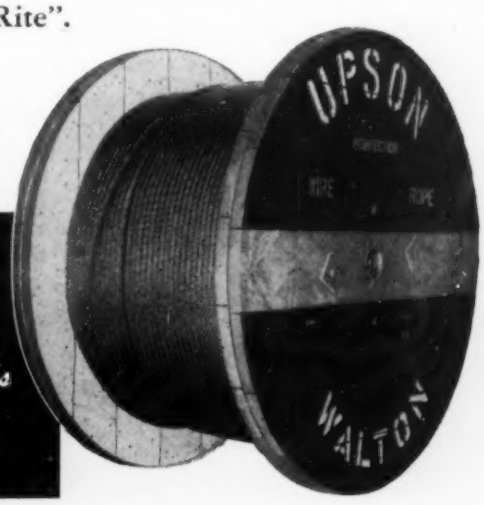
All Upson-Walton wire rope sold today is, at the very least, as good as the finest quality we've ever made. In some respects it is even better, where engineering improvements have been added.

When you specify Upson-Walton, you're always sure of getting the best grade of wire rope. And it costs no more!

When you want Preformed, specify "Upson-Walton Lay-Rite".

U-W
Established 1871

Upson-Walton also manufactures wire rope clips, thimbles and sockets; tackle blocks, snatch blocks, turnbuckles and shackles.

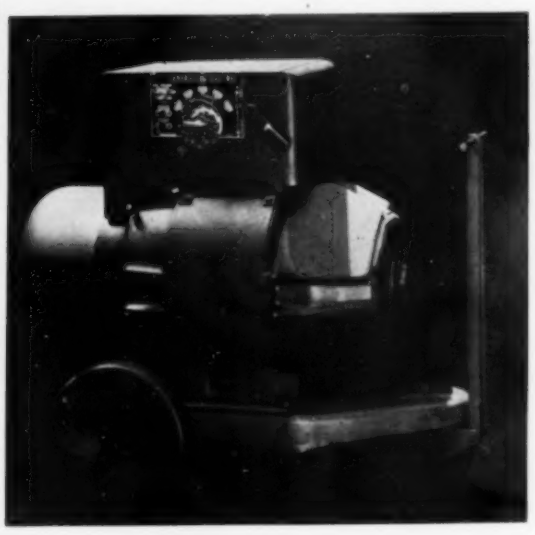


THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

IMPROVED DC SINGLE OPERATOR ARC WELDER is equipped with two new dial controls and redesigned driving motor. Control dials permit welding current to be preset without aid of volt-ammeter, and driving motor is designed for weather resistance during outdoor operation. Control dial calibrated in terms of electrode size, operator setting dial to correspond with size of electrode used. Operator presets welding current by rotating pointer to desired amperage on second dial which indicates available range under various conditions. Driving motor equipped with heavier insulation and weather-protection features, such as enlarged intake openings for ventilating air to keep air velocity low enough to prevent rain and snow from being drawn in and baffle back of openings to keep water out of motor. Motor windings heavily insulated with material particularly resistant to deterioration from salt spray.—**General Electric Co., Schenectady, N. Y.**



★ ★ ★

ACID-PROOF MORTAR made of a type of synthetic rubber, sulphur and other compound ingredients and known as "Tegul-Vitrobond," is of special interest to sanitary or industrial engineers for use in joining bell-and-spigot terra cotta pipe lines for acid resisting sewers for the disposal of industrial wastes which contain acids or other corrosive materials. This cement is claimed to be stronger than the best concrete available, to be inert at temperatures up to 200 deg. F. and to be unaffected by hot or cold acid, corrosive salt or mild alkaline solutions. It has a bond to brick of from 400 to 500 lb. per sq. in. and is impervious to penetration by liquids. It also withstands severe trucking abrasion and mechanical punishment. It is said to have high utility in the construction of acid proof floors.—**The Atlas Mineral Products Co., Mertztown, Pa.**

★ ★ ★

25 PER CENT GREATER MIXING CAPACITY has been obtained in new Wood Roadmixer by increasing diameter of mixing drum from 48 to 54 in., thus cutting down friction resistance within drum and also permitting handling of 8-cu. ft. windrows instead of those of 6 ft. This cuts down number of windrows needed for particular job and results in great saving of time. New machine can build a 20-ft. highway 3 in. thick with one windrow in one pass, according to manufacturers. Unit also features power lift which through four hydraulically operated

BACK OF EVERY ATTACK . . .

Preformed wire rope

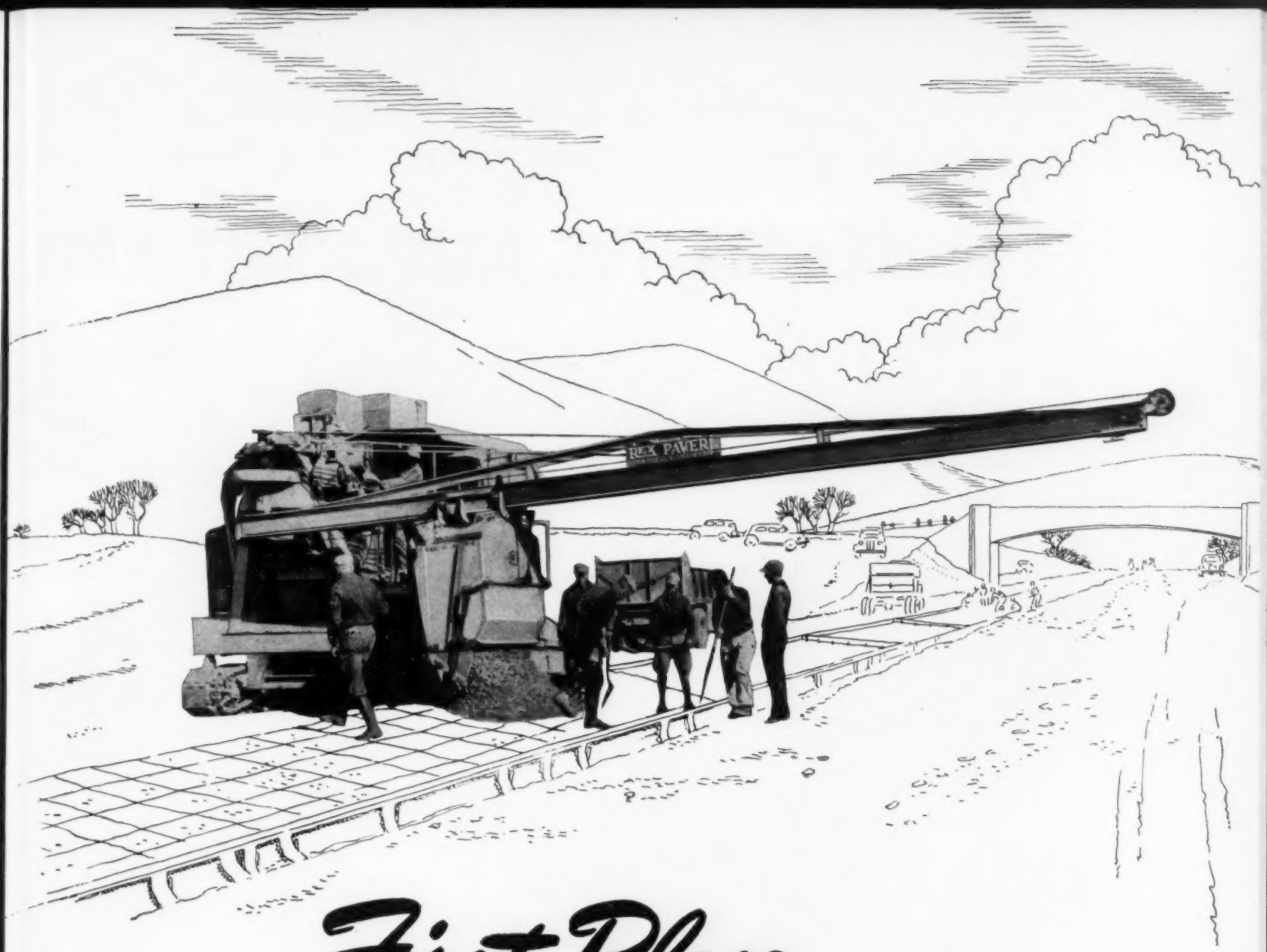
Out where fighting Yanks attack, big howitzers pummel the enemy. But shells that pack a deadly wallop are too heavy for men to lift.

So a crane—rigged with Preformed wire rope—hoists the shell, then shoves it home. Every second counts. That's why the rope is Preformed. It lasts longer than ordinary wire rope. It handles faster and easier, speeding every operation. And it prevents accidents, too, because it's safer.

On the firing line—as on the production line—Preformed is proving that it's the tough wire rope for the tough war jobs.

On practically all kinds of mobile equipment, Preformed is back of every attack.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER FOR PREFORMED WIRE ROPE



First Place

IN PLACING PERFORMANCE

2,000,000 square yards of concrete . . . the equivalent of 180 miles of 20-foot road, and still going strong . . . that's the record of one Rex double drum paver. This exceptional concrete placing performance is typical of Rex pavers. For consistent, high production yardage performance . . . built-in stamina and ruggedness for the toughest jobs . . . Rex 34E double drum pavers are the leaders in the paving field.

In the Rex 34E, the batch transfer and entire mixing cycle are automatically controlled to the split second by the famous Rex Mechanical Man . . . a feature that eliminates expensive wasted seconds. And the roomy, clear vision operating deck makes for ease of operation and faster job progress. The extended crawlers provide stability and allow the boom and bucket to be swung at right angles to the machine without tipping.

For complete information on Rex Pavers and how they can help speed your jobs, send for your free copy of Bulletin 407. And check the other Rex construction equipment: Moto-Mixers, to speed the mixing, hauling and placing of concrete . . . Pumpcretes, the pumps that pump concrete by pipe line . . . Pumps that move water economically and efficiently . . . Mixers that cut concrete mixing costs. See your Rex Distributor or write Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wisconsin.

CHAIN BELT COMPANY
of Milwaukee

REX

CONSTRUCTION MACHINERY

PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

THE WEAPON THE AXIS DIDN'T HAVE

ITALY A 20-B loads landing mats

ICELAND A 34-B builds a road

NEW GUINEA A 15-B grades an airstrip

Shovels, bulldozers, cranes, and scrapers are doing the same basic things now they did before the war. Yet our enemies, for all their years of preparation, failed almost completely to recognize the potential military value of dirt moving equipment. In the hands of American men, long accustomed to brilliant use of machines, excavating equipment is truly a double-edged sword, efficient in war and peace. V-63

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

NEW GEORGIA A 15-B builds a road

ENGLAND Two 22-B's unload rations

ALASKA A 4-wheel Scraper grades the Alcan Highway

ALEUTIANS A 22-B grades an airstrip

He matches and always wins

A typical example of B. F. Goodrich development in rubber

THIS is a B. F. Goodrich tire specialist. He saves tires.

In the picture above he's matching dual tires. The measuring stick he's using quickly shows whether they're mates or whether one tire, being slightly larger, will have to carry the whole load while the other rides free.

Mismatched duals are frequently overlooked. Yet mismatching is one of the principal causes of excessive tire wear, blow-outs and road delays. For years truck owners all over the country were losing precious rubber because no organized, scientific tire maintenance plan capable of eliminating this and other operating faults was available.

Then B. F. Goodrich, drawing on its many years of experience in handling the complete tire care problems of large bus fleets, developed the B. F. Goodrich Tire Conservation Service.

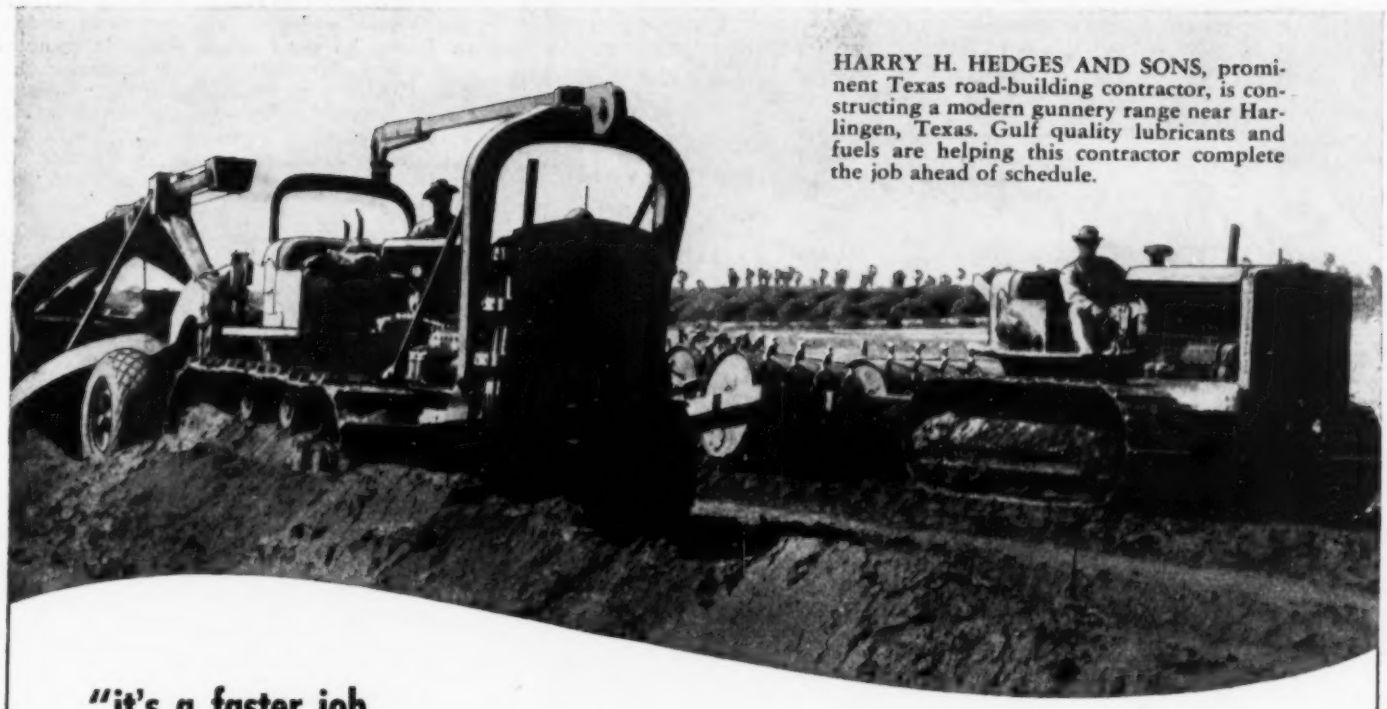
Under this scientific, point-by-point program, which is now being used by truck fleets with from 10 to 3200 vehicles each, factory-trained tire men take over the complete supervision of tire maintenance. Applying all the rubber-saving information they have acquired through solving thousands of other maintenance problems, they give to each tire and tube the personal attention necessary to insure its long life and maximum service.

Hundreds of fleet owners, including many of the country's largest, have already found that this conservation plan saves money, mileage, and rubber.

Because it takes a long time to train men in this work, only a few B. F. Goodrich tire specialists are available to take over additional fleets.

If you would like to know how this service can be applied to *your* trucks to increase *your* mileage, write the *Tire Conservation Dept., The B. F. Goodrich Co., Akron, Ohio.*

B.F. Goodrich
Truck & Bus Tires



HARRY H. HEDGES AND SONS, prominent Texas road-building contractor, is constructing a modern gunnery range near Harlingen, Texas. Gulf quality lubricants and fuels are helping this contractor complete the job ahead of schedule.

"it's a faster job with Gulf Quality Lubricants and Fuels"—

says Superintendent Y. A. Rankin

"Gulf products help us get top performance from equipment with freedom from operating troubles."

"During my 20 years of construction experience, I've learned the importance of using quality lubricants and fuels to get the most out of equipment and keep it working continuously," says Y. A. Rankin, Superintendent on this gunnery range project. "With Gulf Products we're getting the kind of lubrication and fuel performance that spells a speedier job, with low maintenance costs."

The use of quality petroleum products is one of the surest guarantees of efficient job operation and is best insurance against breakdowns and mechanical troubles. That is why so many contractors engaged in vital war construction work specify Gulf quality lubricants and motor fuels.

In addition to their high quality, there are other advantages in using Gulf Products: first, an experienced Gulf Service Engineer recommends, on the job, the proper types and grades for each requirement; second, Gulf's wide distribution through more than 1200 warehouses located throughout 30 states from Maine to New Mexico, insures prompt delivery.

Write, wire, or phone your nearest Gulf office today, and arrange to use Gulf higher quality lubricants and fuels on your next job. They will help you complete it more quickly and at a larger profit.

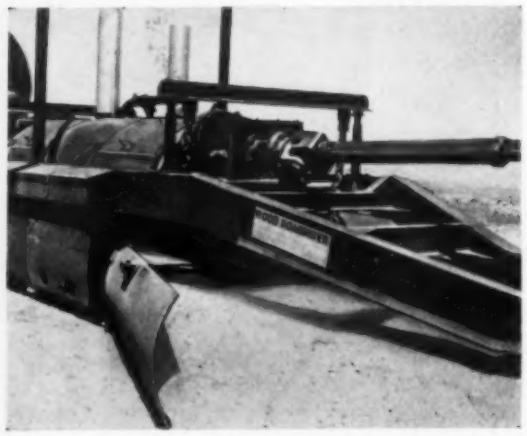
GULF

GULF OIL CORPORATION · GULF REFINING COMPANY

GULF BUILDING, PITTSBURGH 30, PA.

BACK THE ATTACK . . . BUY MORE WAR BONDS!

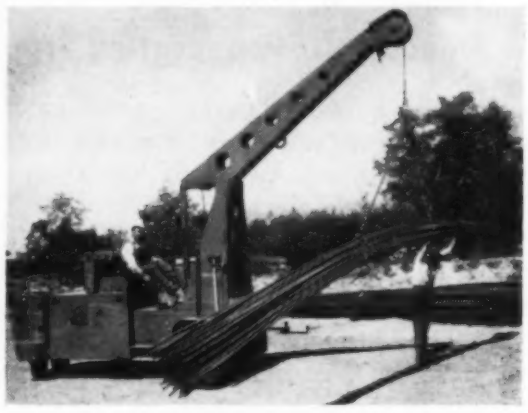
jacks, provides almost instant lifting of drum and cutting blades, either in windrow or at end of pass. Power lift supplements manually operated lifts which are used for fine adjustments during mixing. Faster and easier application of cutting blade to grade has been obtained by increasing size of plungers on jacks. In place of full length axle under mixer, stub-end axles have been substituted. Oversize, single-tired wheels have replaced dual



wheels. Wheels have been moved forward to give better distribution of weight between tractor drawbar and wheels, providing a shorter turning radius and allowing mixer unit to get out of and into windrows quicker. Standard crawler tractor pulls Roadmixer driving mixing mechanism at proper travel speed. Behind mixer is attached binder supply truck from which binder is pumped and delivered under pressure through spray nozzles into mixing drum. Gaged pressure and accurately metered volume insure correct mix. Travel speed and mixing action are synchronized. Crew of two men can usually handle complete Roadmixer unit.—**Wood Manufacturing Co., 816 W. 5th St., Los Angeles 13, Calif.**

★ ★ ★

UTILITY CRANE, known as "Karry Krane," a high speed, self-propelling unit, has capacity up to 10,000 lb. and is said to eliminate need for a revolving boom crane because of its maneuverability. Operates over all kinds of rough and unimproved floors



and roads. Has lift speed of 35 ft. per min. Said to meet requirements of most materials handling problems as loads can be hoisted or lowered while traveling, four speeds forward and reverse may be utilized and operator has full vision while handling bulky loads.—**Willamette-Hyster Co., Portland, Ore.**

Shovels Are Weapons, Too

Don't Waste Their Time

Nobody can afford, these days, to tie up shovels by decreasing on the amount of explosives used. Use explosives right—in the right amounts—and you *may* use less. But you will certainly help your shovel move more yards per hour, help save labor so important in the war.

And—be sure you are using the right explosive for your job. Study, for example:

ATLAS AMODYNS

When an explosive "takes hold" of your rock, it means that it has just the right combination of strength, density and velocity. The two series of Atlas Amodyns are designed to give new exactness to the choice of an explosive. Made in a High Velocity series of six grades, and a Low Velocity series of six grades, all Amodyns have the same weight strength, but each grade has a different cartridge count and hence a different cartridge strength.

***Synergism**—*The meeting of minds "clicking together" from the impact of ideas to give a result greater than the sum total expressed—a "2 + 2 = 5" result. Synergism can be a big help toward making your equipment last longer.*

ATLAS AMODYNS

GRADE	% Weight Strength	Velocity, feet per second, in the open 1¼"x8"	Velocity, feet per second, confined in pipe 1½"x8"	MINIMUM NUMBER 8" CARTRIDGES PER 50 LBS. (MAXIMUM 5% MORE)						
				1⅛"	1¼"	1½"	1¾"	2"	4"	5"
Amodyn No. 2	65	7000	9500	143	118	80	60	46	11	7
No. 3	65	7000	9500	154	127	91	66	50	13	8
No. 4	65	6800	9250	164	137	99	74	54	13	8
No. 5	65	6500	8500	177	147	104	77	58	14	9
No. 6	65	6350	8000	196	160	111	82	61	15	10
No. 7	65	5800	8000	210	173	118	88	67	15	10
Amodyn No. 2-H	65	10000	13000	143	118	80	60	46	11	7
No. 3-H	65	9500	12000	154	127	91	66	50	13	8
No. 4-H	65	9000	11000	164	137	99	74	54	13	8
No. 5-H	65	8500	10500	177	147	104	77	58	14	9
No. 6-H	65	8500	10000	196	160	111	82	61	15	10
No. 7-H	65	8000	10000	210	173	118	88	67	15	10

Interpreting the characteristics of explosives in terms of specific jobs is our specialty. If you have a blasting problem, we would like to work synergistically with you.*

Amodyn: Reg. U. S. Pat. Off.

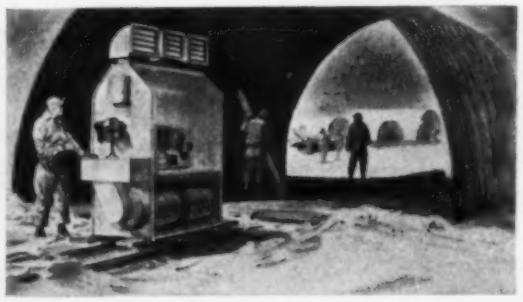
ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

SMALL MODEL DIRECT FIRED HEATER, with capacities ranging from 300,000 to 850,000 Btu., has been designed to meet the problem of heating steel service igloos and similar structures and of providing additional heat for limited areas. Overall



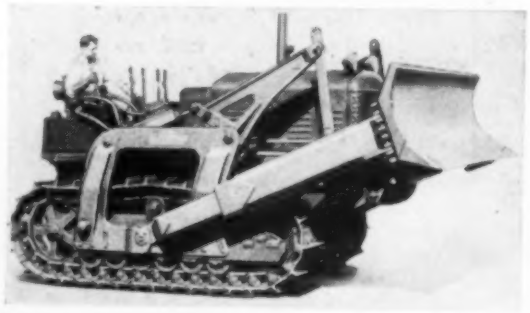
size has been reduced in proportion so that floor space requirements are now just 5¼x3 ft. Heater may also be suspended from the wall where floor space is not available. Burns either gas or oil. Heater is thermostatically controlled and requires a minimum of manual attention—**Dravo Corp., Heater Dept., 300 Penn Ave., Pittsburgh, Pa.**

★ ★ ★

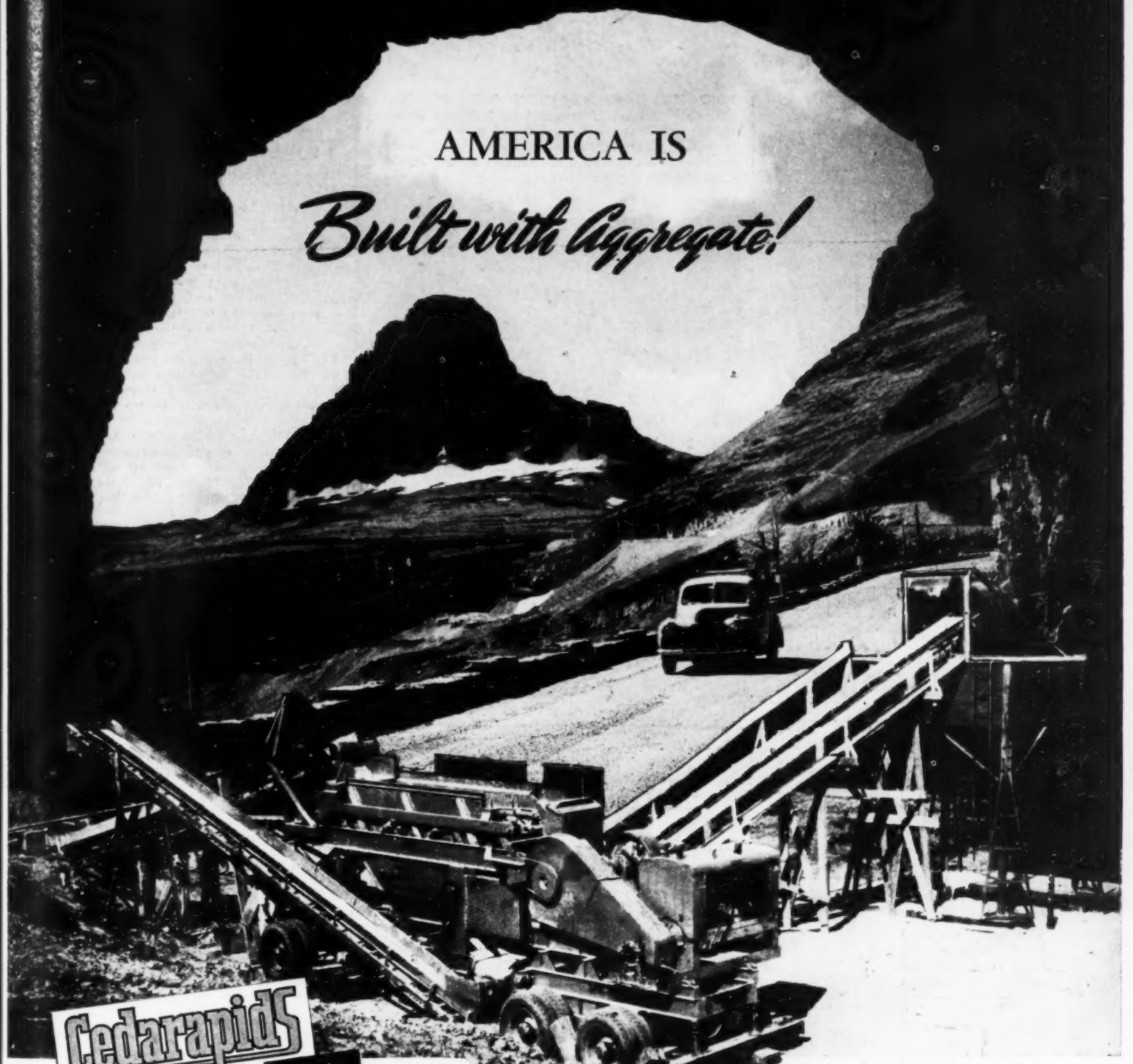
NEW TYPE FILE made of hard, high strength cemented carbide composition, permits filing of revolving work pieces without reducing speed, thereby maintaining production. Ordinary steel files, when used to remove burrs, for example, will break down at these high cutting speeds. Extended service trials have demonstrated that new files will allow filing speeds of three to ten times that possible with steel files and outlast them 50 to 200 times. It will cut steels of a hardness up to 62 Rockwell C., which the ordinary file will not touch and will cut cast iron and brass at surface speeds around 900 ft. per min. High carbon, high chromium steels have been filed at 800 sfm. with the files still in good condition after three weeks of use. Kennametal files are available in one size, 11 in. long, ¾ in. wide, and ⅜ in. thick having a substantial filing surface 4 in. long. It is made of grade K4H Kannametal (80.6 Rockwell C), single cut with teeth at 30-deg. shear angle, 40 per in. Convenient grips for the operator's hands are provided.—**Kennametal Inc., 240 Lloyd Ave., Latrobe, Pa.**

★ ★ ★

FABRICATED BULLDOZERS AND TRAILBUILDERS designed by the Heil Co., and The Cleveland Tractor Co., for use on all industrial models of Cletrac tractors from 30 to 100 hp., eliminates castings wherever possible and by prefabricating mounting



members and moldboard parts reduces "overhang" weights. Blade is 11 in. nearer tractor and by changes in linkage, blade action has been speeded up to that of cable-operated unit. Lift of blade has been increased about 50 per cent, making total lift of Cletrac "FD" blade 52 in.—**The Cleveland Tractor Co., 19300 Euclid Ave., Cleveland, Ohio.**



Cedarapids

Built by IOWA

THE IOWA LINE

of Material Handling Equipment Includes

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS—STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS — TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

GOOD HIGHWAYS MAKE GOOD NEIGHBORS

Whether highways link nations together, like the Alaska Military Highway or Pan American Highways, or are the Farm to Market secondary roads, their primary object is to bring people and goods closer together. Good roads are built with aggregate, and, under the contract system of construction, are symbolic of the freedom of the American way.

More and more aggregate producers are finding that the production of low cost aggregates is the result of refinements in crushing equipment developed by the combination of construction "know how" and American ingenuity which produced the line of Cedarapids plants. The Iowa line ranges from single units to complete plants which can be engineered to meet any aggregate production problem.

Come to Iowa first, it's Headquarters for aggregate producing equipment!

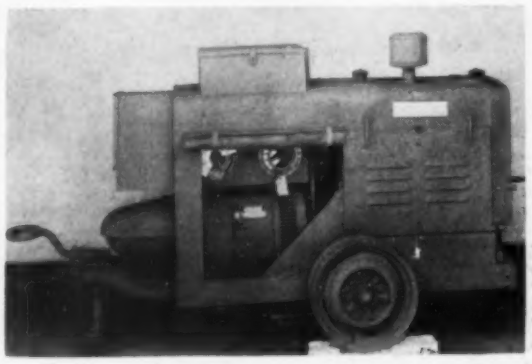
ARMY E NAVY

IOWA MANUFACTURING COMPANY

CEDAR RAPIDS

CEDAR RAPIDS IOWA

PORTABLE GASOLINE-DRIVEN WELDING MACHINE (Model LWL), designed for locations where electric power is not available and where welding is done in rough terrain, is made up of a Waukesha gasoline motor driving a 200-amp. Lincoln. "Shield Arc" welding generator. These units with tool boxes



are mounted on a welded structural shape chassis equipped with rubber tires and a towing attachment. Easily moved by hand. Lifting hook is provided for placing machine on or removing it from truck or freight car. Overall length, 72 in.; width 22½ in. Total weight, 1,500 lb. Similar assemblies using Allis-Chalmers, Willys-Overland jeep or Ford motors with either Lincoln or P&H generators in 200-, 300- or 400-amp. capacities may be furnished. —**Libby Welding Co., 2700 E. 15th St., Kansas City, Mo.**

★ ★ ★

COMPRESSED AIR-LINE WATER FILTER has six ⅜-in. outlets in manifold to accommodate snap-on hose connections, and new self-dumping trap which automatically empties water, permitting use of larger number of filter lines for serving air tool operations at single point and providing for auto-

matic disposal of water filtered out of lines. Closed float on trap assures positive opening and closing of discharge valve. Interior parts heavily plated to reduce rust to minimum. Filter prevents dust, rust, scale, oil and water from entering valuable air tools. Claimed to prolong life and increase efficiency of pneumatic equipment.—**Filters, Inc., P. O. Box 471, Glendale, Calif.**

SOUTHWEST *Hauling Scoop*

SINGLE CABLE CONTROL

Here it is—the first rear dump hauling scoop with *single cable control!* No longer is it necessary to have hydraulic equipment to have a rear dump unit. Southwest does it with the single cable control. And here are some of the advantages: Dumps safely over embankments—Works well in difficult places —Dumps while moving forward, backward or standing still—Shortens operational cycles by *controlled* spreading. Sturdy design and construction to handle tough jobs easily. Ideal for road maintenance and repair.

Four page bulletin available on request. Gives engineering data on the three standard sizes of Southwest Hauling Scoops. Write Department A130 Southwest Welding & Manufacturing Company, Alhambra, California.

The Southwest Single Cable Control Scoop can be operated by a single drum or as a "dozer scoop" combination with double drum unit.

CONSTRUCTION MACHINERY DIVISION

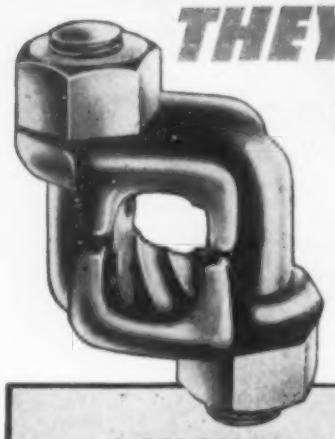
Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA

WINCHES BULLDOZERS CRANES TANKS DUMP WAGONS RIPPERS TAMPERS SCRAPERS

GIVE YOUR MEN "FIST-GRIP" SAFETY-

THEY'LL WORK FASTER



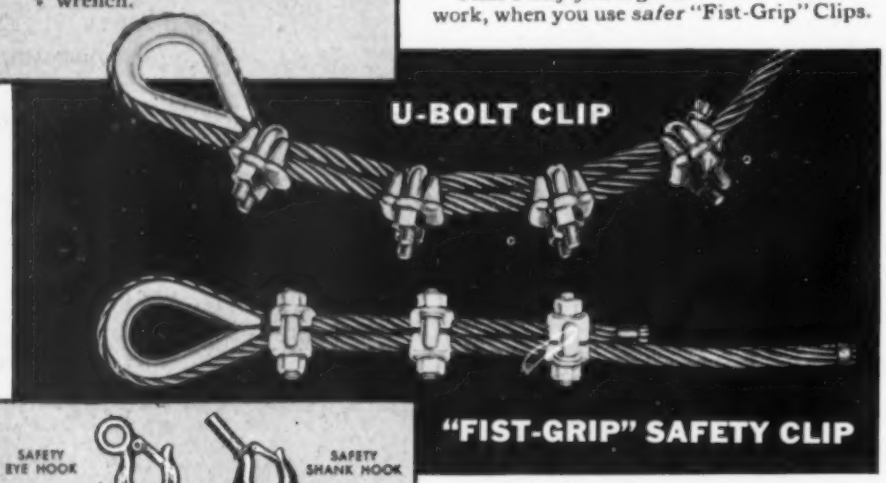
LAUGHLIN "FIST-GRIP" CLIPS give you these 3 advantages

1. **SAVES MANPOWER...** less work to apply; can't be put on wrong.
2. **SAVES METAL...** 25% fewer clips do the job better; no crushed rope ends; no battered threads . . . nuts are flush.
3. **SAVES TIME...** fewer clips speed the job; nuts on opposite sides—easier, faster tightening with any type wrench.

Watch the way your men handle Laughlin "Fist-Grip" Safety Clips. They don't fumble and fidget with them . . . even the green men will put them on quickly, easily, and without any chance of getting them on backwards.

They see how the clips work . . . like a fist-grip, not a finger-pinch . . . and they understand why three "Fist-Grip" Clips do the work of 4 U-bolts . . . because each clip has four bearing surfaces.

That's why you'll get *better* work, *faster* work, when you use *safer* "Fist-Grip" Clips.



EXTRA SAFETY IN LAUGHLIN HOOKS TOO

The uniquely-designed, strong springed safety feature securely traps the sling — prevents its accidental slipping or jolting off.

Laughlin Safety Clips hold rope straight. No finger-pinching action to crimp, causing reverse strains when rope is applied.

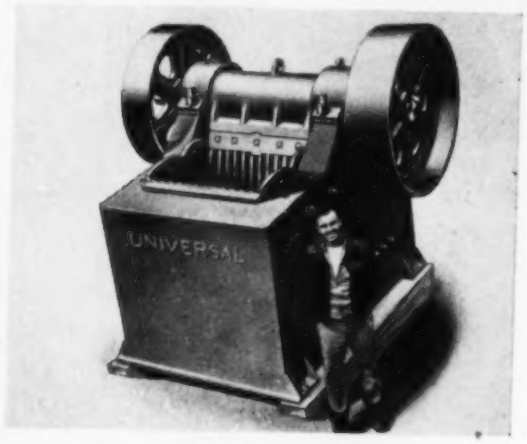
SEND FOR folder describing competitive tests. Insurance Companies' approval.

FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN *Company*
PORTLAND 6, MAINE

Distributed Through Mill, Mine and Oil Field Supply Houses. Look for Laughlin Products in Powers' Road and Street Catalog.

WELDED STEEL PLATE JAW CRUSHERS, in two sizes with 30x42- and 20x36-in. feed openings, have lateral and transverse ribbing and heavy plate sidewalls which impart structural strength necessary to prevent distortion of frame and misalignment of bearings, and yet, have no excess weight. Four SKF roller bearings are used, two on the pitman and two on the frame, one on each side. Bearings are labyrinth sealed against grit and grease and are Alemite lubricated. These new crushers employ same crushing action as that provided for in other Universal crushers. Two distinct blows with each revolution of the eccentric shaft are produced by the high eccentric and radial toggle action—a primary blow at the top of the jaws and a secondary stroke at the bottom—**Universal Engineering Co., Cedar Rapids, Iowa.**



Today our armed forces are getting every available Byers

When the War is Over . . .

BYERS will offer you new, improved, faster, mobile shovels and cranes for peacetime jobs . . . and you'll get them

In the meantime, owners of current and older models of Byers shovels and cranes may depend on Byers Parts Service to help them keep present equipment working steadily and satisfactorily.

BYERS CRANES AND SHOVELS
RAVENNA, OHIO
DISTRIBUTORS THROUGHOUT THE WORLD

The War Showed the World A NEW CANVAS

Picture a more gruelling test for cotton duck, first cousin to gun cotton in burning qualities; subject to the same natural deterioration as any organic matter in the elements; victim of the virile mildew fungus.

Yet that same cotton duck has gone to war. Resisted every incendiary that the enemy could throw over; every deteriorating influence that the swamps of Guadalcanal, the deserts of North Africa, the bleak winds of Iceland and Russia, and the salt spray and tropical heat and rains of the South Pacific could muster.

But, of course, that cotton duck was FIRE CHIEF-treated Canvas — the original fire-, water-, weather- and mildew-resistant HOOPERWOOD "Engineered Canvas."

What does this triumph of "Canvas Engineering" hold for the post-war world? Many things, among which are: construction windbreaks that hot rivets or welding torches won't ignite . . . awnings that won't burn, mildew and rot . . . truck covers outlasting their predecessors several times over . . . ships' hatch covers and lifeboat covers that present no fire hazard . . . and many other superior canvas products.

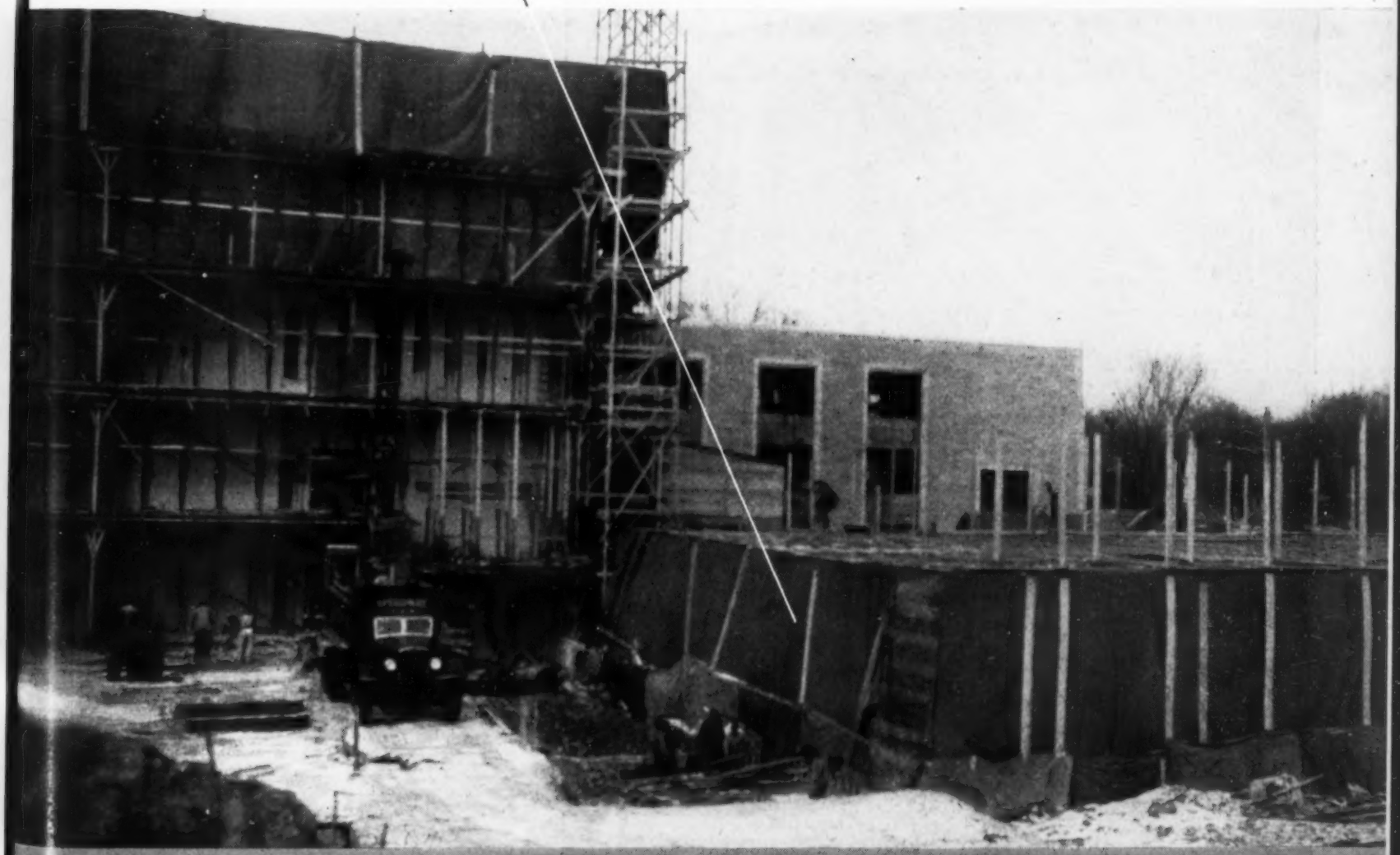
If you are interested, write for new bulletin, "War Proved for Post-War Service."

WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: WOODBERRY, BALTIMORE, MD.

Since 1800 (through six wars) the HOOPER name has symbolized highest quality in Cotton Duck and other Heavy Cotton Fabrics, Paper Mill Dryer Felts, Filter Cloth, Rope, Sash Cord.



• *Fire-Chief Finished* (PATENTED) •

HOOPERWOOD COTTON DUCK

NEW PRINTER, known as Bruning 55C Continuous Photographic Printer and designed to take full advantage of time saving features inherent in semi-photographic reproduction processes, provides clear and faithful duplicates of anything typed, printed, photographed or drawn. Although this model is a 42-in. printer, it is exceptionally compact in design and requires floor space of only 40x62 in. It may be used either inside or outside of dark room and operates either will roll stock or cut sheets. Speed 0 to 18 ft. per min. Either of two fluorescent lamps, one white and one amber, may be used in making exposures. Printing light effectively sealed

for dark-room use. Constant speed motor drives variable speed transmission which is controlled by knob within operator's reach. Speed changes instant and positive. Further control of exposure is obtained by shutter arrangement which varies exposure space from 0 to 14 in. Speed of machine and shutter is individually controlled. In designing machine, special care has been taken to provide good contact necessary for proper reproduction. 9-in. pyrex cylinder revolving contact with 22 individual 2-in. bands assures register of originals and sensitive material and prevents slippage which might cause blurred prints. Large print return tray makes possible easier handling of work. Foot pedal enables operator to reverse travel of prints through machine. Feed board and all controls are illuminated to facilitate handling. Electrical requirements, 4 amp. operating 110 v. Machine is wired for 100 v. a.c., 60-cycle, or 220 v., d.c.—**Charles Bruning Co., Inc., 4700 W. Montrose Ave., Chicago, Ill.**

★ ★ ★

HANDY CALCULATOR for use of woodworkers is designed to help craftsmen solve puzzling problems that crop up on a job. By adjusting dial, linear feet may be converted to board feet, slope per foot in degrees may be determined, comparative hardness, weights, shrinkage, warping and ease of working of various woods may be found. Bit sizes for head, body and thread of standard screws, nail specifications, tips on tool sharpening also are included on this Calculator which is an accurate protractor as well. Construction of heavy varnished cardboard, soilproof, this tool is 6 in. in dia. and should fit in any tool kit quite easily. So long as supply lasts, this Handy Calculator may be obtained for 10c by writing direct to **Greenlee Tool Co., Rockford, Ill.**

Get ready TO TACKLE THAT *$3,000,000,000 Annual Paving Job!*

Only Multi Foote Pavers Give You All These Features

DOUBLE CONE DRUM with its end-to-end scouring action insures a complete and thorough mix of every batch.

TROUBLE-FREE WATER SYSTEM is simple, accurate and independent of water pressure.

HIGH OPERATING PLATFORM assures greater visibility and faster, more accurate work.

ROTARY DISCHARGE takes only a quarter turn to kick concrete into the big bucket ready to speed out the long boom to be discharged.

BIG, WIDE, SOLID SKIP prevents spilling and assures fast, positive charging.

SIMPLE, RUGGED DRIVE provides fast, smooth action.

Three billion dollars worth of paving jobs will be awarded annually to the lowest bidding contractors. You can be certain to get your share if you have Multi Foote Pavers like those that have given such impressive performance on war front construction. Their records for speed and low cost are the reasons why there are more Multi Foote Pavers in service than any other make.

Big capacity for big jobs, yet profitable to use on smaller ones too. Simple, easy operation and maintenance, speed and dependability second to none, proved superior design — these are only a few of the reasons for Multi Foote leadership. Write today for details.

THE FOOTE COMPANY, INC.

Multi Foote Pavers Conform to A. G. C. Standards and Specifications.

NUNDA • NEW YORK

The World's Largest Exclusive Manufacturers of Concrete and Black Top Pavers.

ARMY (E) NAVY

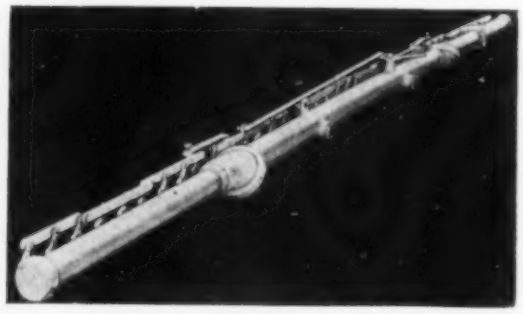
MULTI FOOTE
CONCRETE PAVERS

"AIRLINED" HARD HAT (front and rear views) has corrugations molded into crown for added strength and protection to workers in shipyards and on construction projects. Full-floating, self-adjusting sweat

band shapes instantly to any size of head after hammock string is adjusted, rendering unncessary the stocking of more than one size of this headgear. —**E. D. Bullard Co., 275 Eighth St., San Francisco, Calif.**

★ ★ ★

FULL CIRCULATING HOT SPRAY BAR for use with any asphalt distributor was designed to handle heavy bituminous liquids and is said to be a solution to the problems of "after shut-off drip", non-uniform distribution, leaky valves, fat and lean streaks and clogged orifices. Hot

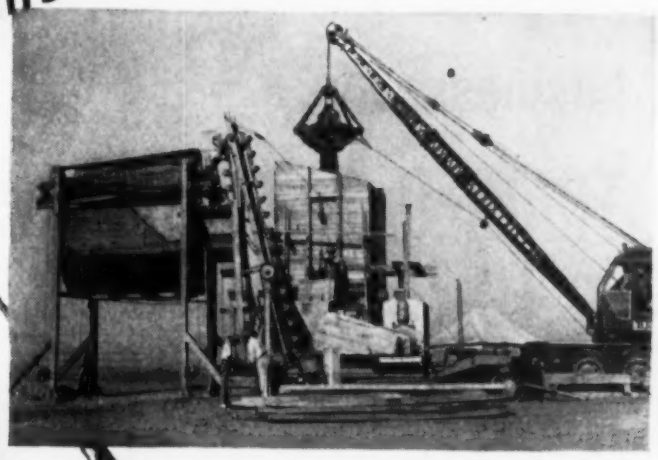


material is circulated under pressure full length of bar, heating it thoroughly and quickly. Made in three sections. Two swing unions allow end sections to be swung up and out of way while crossing bridges without affecting circulation and also permits bar ends to pivot when hitting an obstruction. With both end bars swung up, width of roadway up to 7 ft. can be sprayed.—**The Cartwright Asphalt Equipment Co., Inc. Galion, Ohio.**

★ ★ ★

COMBINATION COMPRESSOR-GENERATOR is compact source of compressed air and electric current arranged for location under work bench in portable machine shop, either truck, trailer or railway car. Will produce 60 cu. ft. of compressed air at 100-lb. gage pressure; or 5 kw. of single phase ac. current at 120 v.; or compressed air and electric current simultaneously to extent of engine horsepower. Safety vacuum control limits supply of air compressed when an electric load is being carried. Description of units: generator, 5 kw., single phase, 60 cycle, 120 v. ac. current with built-in exciter, di-

Your LINK-BELT SPEEDER HAS GONE TO WAR On Fronts All Over The World!



These Link-Belt Speeder truck cranes are being put to work building docks, roads and bridges for U. S. Army use on the supply route through Iran to Russia. It is a grueling, difficult job—the type on which contractors have found Link-Belt Speeder's rugged, maintenance-free service of real value!

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO-9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

In business, too,

TRAINED men reach the top!

Like commissioned officers in our armed forces, business men and industrialists who "reach the top" have a working knowledge of *fundamentals.*

They know how the basic principles underlying business and industry operate; they understand marketing, accounting, finance AND production.

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The Institute's Modern Business Course and Service is designed for men who recognize the obvious necessity of understanding all FOUR important departments of business and industry. It is practical, intensive and scientific!

With the help of Institute training, ambitious men can strengthen their present positions while preparing for bigger, better jobs tomorrow.

Among the prominent men who have contributed to the Course are: Thomas J. Watson, President, International Business Machines Corp.; Frederick W. Pickard, Vice President and Director, E. I. du Pont de Nemours & Co.; Clifton Slusser, Vice President, Goodyear Tire & Rubber Co.

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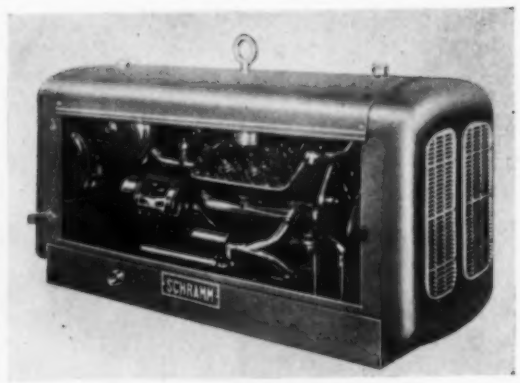
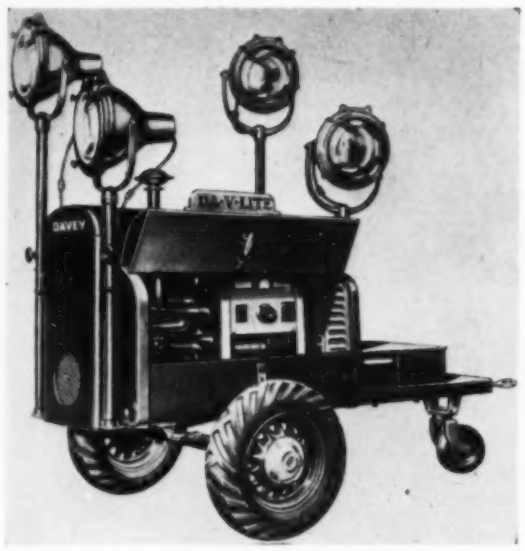


rect driven from fly wheel of compressor; compressor, standard Model 60 Fordair mounted on welded steel frame with electric starter, voltage controlled type battery charging generator and gasoline pump.—**Schramm, Inc., West Chester, Pa.**

★ ★ ★

PORTABLE LIGHT AND POWER UNIT, for use on construction projects, utility emergency repairs, mine operations, logging, quarrying, airfield lighting and wherever dependable light and power are needed, is powered by heavy-duty 4-cylinder, V-type, air-cooled engine which operates a Westinghouse single-phase, 6-cycle, 120-v. generator delivering 5 kw. for lighting and power. Available in four models: "Floodlight," designed to worklight a large area and equipped with four 16-in. Westinghouse floodlights of 35,000 cp., each individually operated from control panel, adjustable



in all directions and to heights of 9 ft., if desired; "Searchlight" for intense light on small areas or for projecting light a considerable distance is equipped with two 18-in. Westinghouse searchlights of 1,935,000 cp. each; "Standard Combination" provides two 16-in. lights and two 18-in. lights with control range and power, as mentioned above; "Beacon," for directional lighting at airfields or for emergency work in coastal areas, is equipped with one 24-in. searchlight of 11,280,000 cp. Power unit of all models is inclosed in sheet-steel, weatherproof body. Illuminated control panel makes operation safe and trouble free. Two 30-amp. double receptacles for operating power tools are furnished.—**Davey Compressor Co., Kent, Ohio.**

LARGE SKIP AREA

If you have idle construction equipment, make it available for home front use, where it is urgently needed. Register all your idle equipment with the local office of the War Production Board.

EASY and QUICK BATCH SPOTTING

High speed pouring requires high speed in every operation. Important operation in the batch cycle is the loading of the skip. Koehring Paver skips are large, streamlined, without corners, designed for flow-line charging, wide enough for easy entrance of batch truck tires. Skips have sufficient area to hold the maximum size batch without crowding. Heavy plate construction with replaceable liners and tire tread plates assure a rigid unit for batch truck loading.

KOEHRING COMPANY • *Milwaukee 10, Wis.*

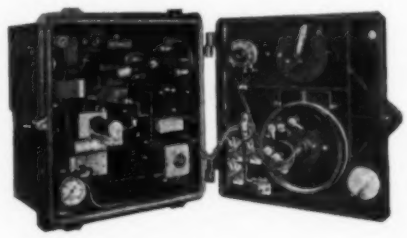
MEMBER MIXER BUREAU—AFFILIATED WITH A. G. C.

KOEHRING HEAVY DUTY

ARMY E NAVY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

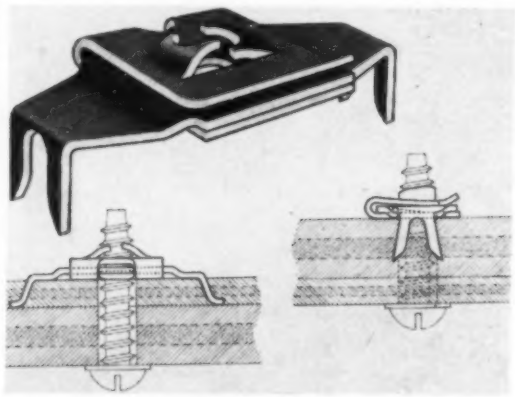
ELECTRONIC PNEUMATIC INDICATING CONTROLLER is claimed to be first instrument of its type that does not use motor or other continuously moving parts. Other features include: continuous action, no measurable "dead zone," highest sensitivity and adjustment to low sensitivity, no mechanical connection between galvanometer and pneumatic circuit, no "flapper" and simple load error adjustment. Output air is precisely and stably controlled to provide utmost in performance. On-and-



off or open-and-shut control is available in two models, high sensitivity, non-adjustable throttling or on-and-off without throttling. Magnetic air valve acts as amplifier and converter from electric to pneumatic operation. Manufacturer claims that this instrument is: (1) least affected by process lag; (2) nearest approach to ideal performance; (3) fastest response; (4) stable at smaller throttling zones; (5) not affected by long leads; (6) simple in operation and adjustment; (7) vibration proof.—**C. J. Tagliabue Manufacturing Co., 550 Park Ave., Brooklyn 5, N. Y.**

★ ★ ★

FLOATING ANCHOR-TYPE SPEED NUT for plywood may be driven instantly into anchored position, regardless of material thickness. When driven into thick plywood, the integrally formed attaching legs are forced outward to anchor the nut in screw-receiving position. Used in thin plywood, the locking legs "peen" over when driven against a back-



ing plate. U-type nut, snapped over the saddle, provides "float" to compensate for any misalignment of clearance holes. The saddle is offset to retain full contact with the plywood. The large bearing surface distributes the load over a greater area than is usually possible with ordinary fasteners. Made of SAE 1060 steel heat treated, then Parkerized and coated with zinc chromate primer. Available for use with 6Z 8Z and 10Z sheet metal screws and 6-32, 8-32 and 10-24 machine screws, none of which weigh more than 6 lb. per 1,000 pieces.—**Tinnerman Products, Inc., 2116 Fulton Road, Cleveland, 13, Ohio.**

Locomotive "No. 1," which puffed its way across the dales of mid-Wisconsin in 1851, was one of the trail blazers for the present magnificent transcontinental system of the Milwaukee Road.

Movement of vital war freight was speeded and tonnage increased when the Milwaukee Railroad installed General Motors Diesel Locomotives on the 225-mile mountain zone between Avery, Idaho, and Othello, Washington.

PATTERN FOR FINER TRANSPORTATION

WRITTEN into the grueling war job the railroads of America are doing, is the story of this mighty titan of the rails. This is the General Motors Diesel Locomotive. It is displaying the unusual stamina, speed and willingness to work ceaselessly which these urgent times demand. And with such tireless, low-cost, swift service these GM Diesel Locomotives are providing a pattern for finer transportation in the greater days to come.

★
KEEP
AMERICA
STRONG
BUY MORE
WAR BONDS
★

GM
GENERAL MOTORS
DIESEL
POWER

LOCOMOTIVES . . . . . ***ELECTRO-MOTIVE DIVISION,*** *La Grange, Ill.*

ENGINES . . *150 to 2000 H.P.* . . *CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio*

ENGINES . . . *15 to 250 H.P.* . . . . . *DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.*

PORTABLE V-WAY HYDRAULIC VISE. semi-steel of precision construction and with simplified, hydraulic foot control, is designed to meet problems of mass production requirements and to give satisfactory performance in holding or handling material. Two levers are used in hydraulic foot control: one

to apply pressure up to rated tonnage; other for release which has a two-speed return. No outside airlines or power needed. Unit is self air eliminating. Operator's hands are free for work. Equipped with flexible hydraulic hose which lends adaptability to use on other machines. Two sizes available, 4-ton with 4-in. opening and 7-ton with 7-in. opening.—**Reimuller Bros. Co., 9400 Belmont Ave., Franklin Park, Ill.**

Maintaining Compressors at Peak Operating Capacity

By BRUNO THIEL

The Cooper-Bessemer Corporation
Mount Vernon, Ohio, and Grove City, Pa.

IN VIEW OF TODAY'S SHORTAGES in replacement parts, and with wartime requirements demanding that compressors be kept at peak operating capacity even when subjected to long periods of uninterrupted service, it is important that plant maintenance engineers follow certain fundamentals that apply to the care and maintenance of compressor units.

The following suggestions are therefore summarized for the purpose of assuring the most efficient performance of large compressors regardless of the type of service they are rendering.

Lubrication

Minimum wear of moving parts can be assured by using the proper grade of lubricating oil. Too much oil, even of the best grade, will eventually gum up piston rings and cause them to stick in the grooves, thus reducing the capacity of the compressor due to piston ring leakage. Excessive wear on the cylinder walls may also result because the wire-drawing of the gases between the piston and cylinder wall will blow off the lubricating film and permit a metal-to-metal contact. The excessive oil will also collect on the discharge valves and will carbonize on the hot seats, permitting the valves to leak. Insufficient lubrication will naturally cause wear on piston rings, piston and compressor cylinder.

While there are no hard and set rules governing the lubrication of compressor cylinders, each operator should set up his own standard to apply to individual requirements, the basis of which depends upon the gas that is being compressed and the nature of the oil being used. For example, when gases containing gasoline vapor or a large percentage of the hydrocarbons are being compressed, a lubricant that is insoluble in the gas should be used. Such lubricant may be a soap solution, castor oil, or a blend of castor and petroleum oil.

It is good practice to remove a cylinder head occasionally to check the condition of the cylinder wall and make sure the cylinder is receiving the proper amount of lubrication.

Valves

All compressor valves, whether plate or poppet type, should be thoroughly overhauled so that the valves will close tightly when installed in the cylinder

(Continued on page 120)

already finished

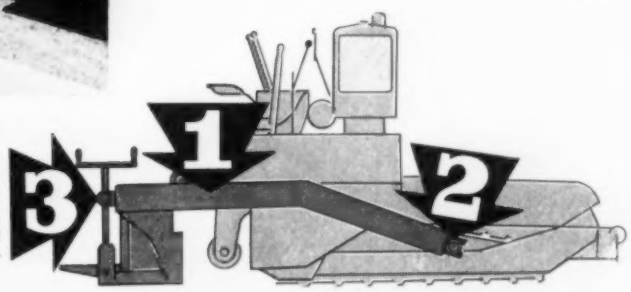
"Wot's the use?" growls Gloomy Gus. "All day I tramp up and down and I don't get a chance to complain. No high spots; no low spots; no nuthin'; just flat pavement." That's why they call him Gloomy. Gus' job is to find the bad spots —the spots that are not level; that have to be patched up. Gus is not the final judge, though. The guy that drives across the stretch ten years after you leave is the real critic. He knows even better than Gus how good a job you did. Most jobs look good when you first put them down. How do they look ten years later?

Left: B-G Asphalt Finisher laying top course even with top edge of gutter.

The Leveling principle on the Barber-Greene Finisher is one of the many features that assures a smooth riding road. The Tamping action assures a long life for that smoothness. Unevenness and abrupt changes in the sub-base and base become a smooth flowing of the pavement. The mat smoothly rises and falls to meet the general contour of the roadway.

44-10

The profile view at right, with sideplate removed at spreader screws, shows the Leveling Arm principle. This arm (1) is attached to the screed unit at the rear of Finisher, much like a rake handle is attached to the raking teeth. The extreme end of the rake handle, or Arm, is attached to the tractor unit (2). A rise or fall of several inches of the crawlers is therefore reflected only slightly on the screed plate. Try this action yourself with a rake. To make changes in mat thickness, the rear of the screed plates are screwed up or down by the control (3) at the opposite end of the Arm. The screed then gradually rides up to increase or cuts down to decrease the mat thickness. Catalog 879 clearly illustrates this operation.



BARBER GREENE

AURORA, ILL., U. S. A.

(Continued from page 118)

body. A leaking valve soon heats the valve and its surrounding area to a temperature considerably higher than the operating temperature for which the unit was designed. Excessive heat thus generated will warp the plates of the plate valves, resulting in even greater leakage or, in case of a poppet type valve, will cut and destroy the valve seat and face.

Piston Rings

Rings should be free in the ring grooves but should not have excessive play. Each ring should be fitted individually to the compressor cylinder bore so that expansion of the ring under normal heat will not butt the ends together and force the ring out against the cylinder wall to cause undue wear.

Cooling Water

Compressor cylinder jackets should be kept clean and free from scale. The water used to cool compressor cylinders should be of a composition that will prevent excessive scaling in the jackets at the normal operating temperature of the compressor. All foreign matter such as mud, grit and similar substances should be removed from the water before it is circulated through the compressor cylinder jackets. The amount of water, however, should be so regulated that the cylinder jacket and liner are not cooled to an abnormally low temperature as this condition will decrease the clearance between the hot compressor piston and the cylinder wall, thus inducing a sticky piston. A temperature differential of about 20 deg. F. should be maintained between the incoming and outcoming water. If the incoming water is too cold it should be corrected by bringing the temperature to at least 70 deg. F.

Loading

Under today's conditions, when restrictions hold up delivery of replacement parts or make them unobtainable in some nstances, cylinders may occasionally have to be used for pressures exceeding those for which they were designed. In such cases, extreme care should be exercised to keep the working pressure at or below that stipulated by the manufacturer of the cylinder. If the cylinder is to be used for pressures other than those for which it was intended, it is good policy to consult the manufacturer for his opinion as based on the changed operation conditions. Such practice will avoid damage to either the compressor or the mechanism which drives it.

Compression Ratios

Compression ratios should be kept as low as possible to prevent overheating compressor cylinders. While overheating

(Continued on page 122)

The steel backbone of concrete in Rockefeller Center

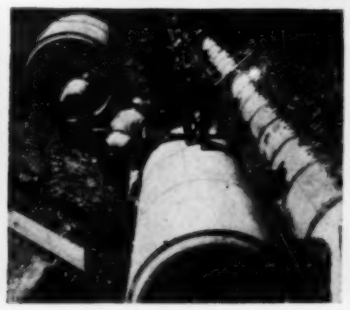
IN ROCKEFELLER CENTER, New York, as well as in many of the country's foremost buildings, millions of square feet of American Welded Wire Fabric have made concrete floors, roofs, and walls safe, long-lasting and fireproof. Wire fabric provides a backbone of steel that weaves strength into the concrete slab in every direction.

This product, manufactured from high-yield-point cold-drawn steel, is convenient to handle, is installed quickly and easily, lies flat, and always stays in place. Where wire fabric is used, construction time is cut, costs are reduced, and a permanent structure is the result.

We will be glad to send you additional information explaining why wire fabric is the ideal reinforcement for concrete work.

Highways—Added years of useful life are built into highways which are reinforced with cold-drawn welded wire fabric.

Buildings—The cost of installing wire fabric is low—construction time is reduced. Here it is being used for reinforcing concrete floors.



Concrete Pipe — Engineers make long life and economy doubly certain by specifying wire fabric for reinforcing concrete pipe.

Airports—Runways, ramps, roadways and aprons will last longer and require less maintenance when reinforced with wire fabric.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

AMERICAN WELDED WIRE FABRIC

UNITED STATES STEEL

(Continued from page 120)

may not always damage the compressor cylinder, it might result in a temperature higher than the flash point of the lubricating oil, in which case fires or explosion may occur, particularly in compressors operating on air.

Overheated conditions also lead to excessive carbon deposits in piston ring grooves and valves. A high ratio of compression in a compressor built for a low compression ratio, may also overload the piston rod and running gear.

Cleanliness

As with any fine piece of machinery, the compressor should not only be kept clean but the operator should take steps to be sure the gas being compressed is as clean as practicable. Gases containing dust or other abrasives will soon wear the compressor piston rods, rings and cylinder walls to such an extent that the compressor will require reboring and complete overhauling long before the normal time set for such operations.

Corrosion

If the gas to be compressed contains any of the corrosive gases such as hydrogen sulfide, the manufacturer should be consulted for his opinion as to whether the compressor can be operated satisfactorily for such service. Many times a few minor changes will render a standard compressor suitable for compressing highly corrosive types of gases.

Careful attention to the foregoing simple but important details will help greatly to assure peak operating capacity of compressor installations with a minimum of maintenance time and cost.

★ ★ ★

Installation and Care of Synthetic Rubber Tubes

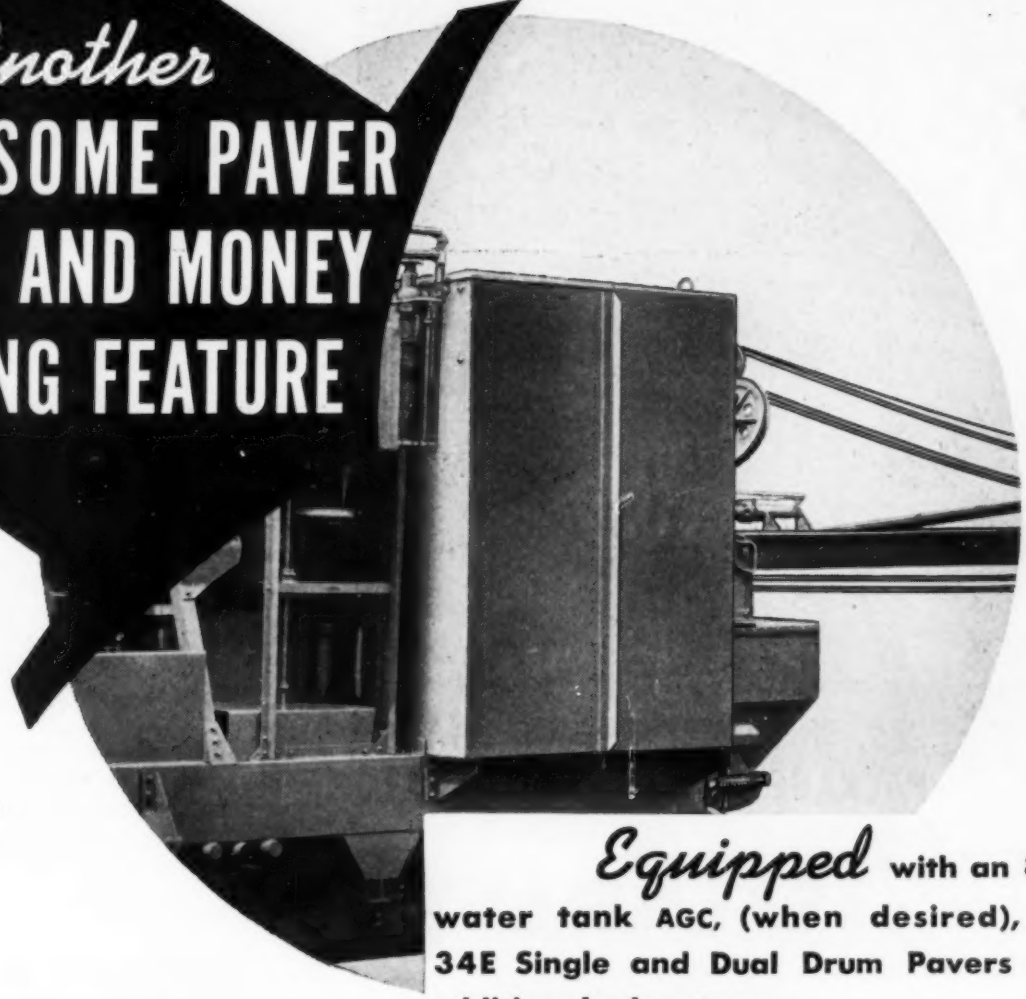
WITH INTRODUCTION OF SYNTHETIC RUBBER TUBES for automobile tires, The Goodyear Tire & Rubber Company announced today a list of directions and precautions to be followed in placing the tubes in use.

Although the synthetic rubber tubes will serve generally as well as prewar natural rubber tubes, Goodyear pointed out that the former present several new problems. For instance, because synthetic rubber is not as elastic as natural rubber, it is subject to base splitting if caught even temporarily under a bead and sub-

(Continued on page 124)

Another

RANSOME PAVER TIME AND MONEY SAVING FEATURE



Equipped **with an 800 gallon water tank AGC, (when desired), Ransome 34E Single and Dual Drum Pavers has these additional advantages:**

- **ELIMINATES** the services of one water tank truck and driver . . .
- **PROVIDES** water for approximately 25 batches of concrete at the mixer at all times . . .
- **ELIMINATES** loss of time in changing from one tank truck to another . . .
- **PERMITS** constant operation of the mixer should tank trucks encounter delays in transit . . .

All in All, from a maintenance and operation expense standpoint, Ransome Pavers give more value per dollar invested. For your next paving job, use a Ransome. We will be glad to give you more reasons why you should.

RANSOME — America's first & finest MIXER

CONSTRUCTION EQUIPMENT DIVISION **Ransome MACHINERY COMPANY**
DUNELLEN, NEW JERSEY
SUBSIDIARY OF WORTHINGTON PUMP AND MACHINERY CORPORATION

(Continued from page 122)

jected to undue stress or strain at any point during the mounting operation.

These are the Goodyear recommendations for mounting synthetic rubber tubes in all passenger automobile tires:

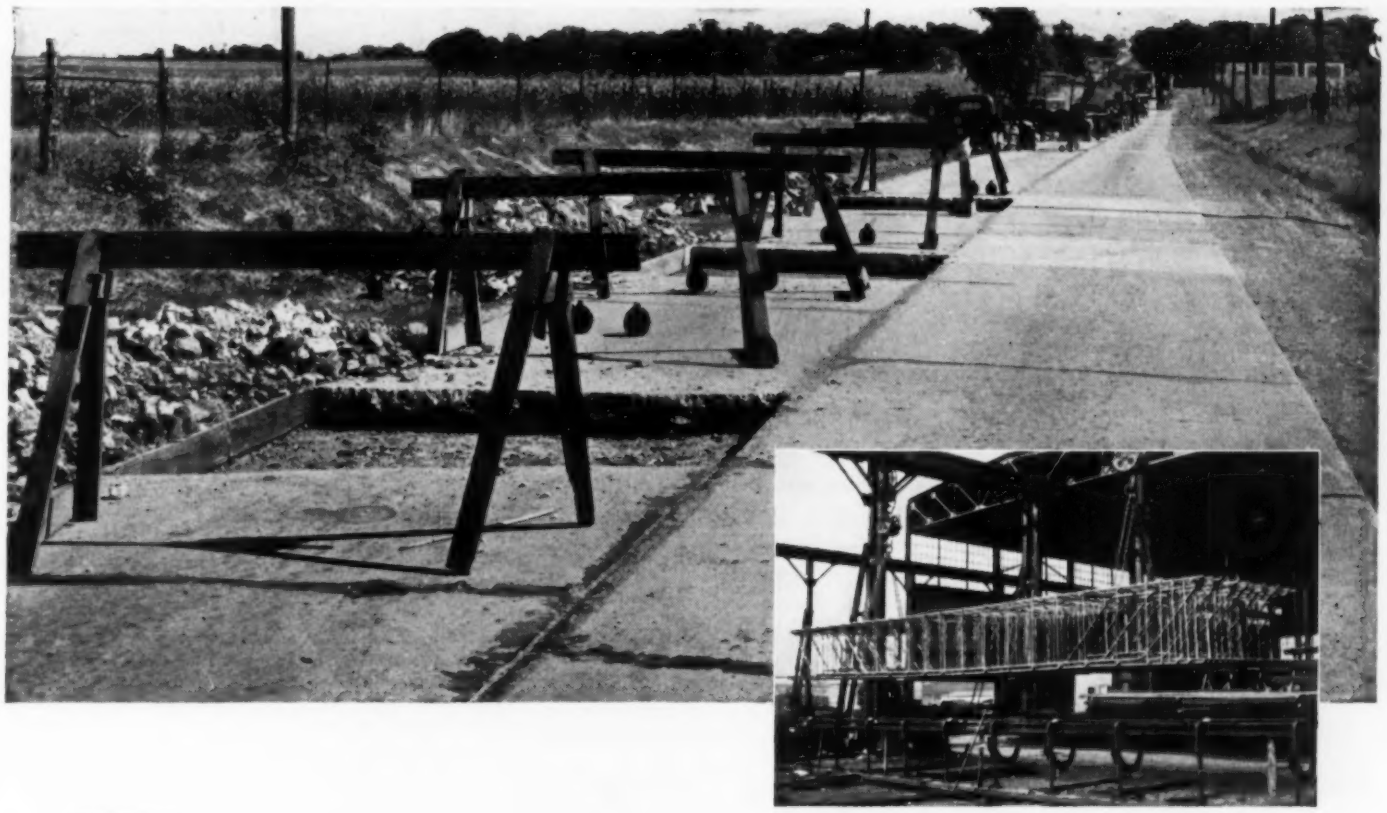
(1) Inflate the tube about three-quarters full or to the point where it starts to round out. Then insert the tube in the casing.

(2) When the tube is inside the tire, paint both tire beads and base of the tube with a thin soap-and-water solution, made with high-grade soap flakes.

(3) Mount the tire on the rim and adjust to centered position so that the beads are out of the rim well.

(4) Inflate the tube to seat the tire beads firmly against the rim flanges. Then remove the valve core, deflate the tube completely, replace the valve core and re-inflate to operating pressure.

Ammerman warned that punctured or damaged tubes should be vulcanized instead of attempting to repair them with the cold patches which were conventional for natural rubber tubes.



This "cage" of reinforcing steel was supplied by Bethlehem for the concrete road-bed of a new Pennsylvania Railroad bridge near Trenton, N. J. —a rush job on one of the nation's vital railway arteries. The complicated unit was prefabricated in Bethlehem's Philadelphia warehouse, and shipped to the job site as shown.

Next time *you* need reinforcing bars, even though you may not wish to have them preassembled and shipped as a unit, remember there's a Bethlehem warehouse near you, equipped to cut and bend bars in any shape or size you require.

Why concrete roads need steel reinforcement

No steel reinforcement in this concrete road—and so it's cracking up. A tragic and familiar story, today, when wartime traffic jounces and bounces over obsolescent highways, chewing up precious rubber, suffering delays, and putting a cruel strain upon essential vehicles.

Fortunately, however, the great majority of our roads have stood up sturdily under their heavy burdens —thanks to wise pre-war building practices.

In the construction of such highways, without which our war production effort might have been a very different story, Bethlehem Road Products have played a substantial role. Bethlehem Reinforcing Bars, Bar Mats and Road Joints, embedded in the concrete, have helped prevent cracks and heaving.

In addition, Bethlehem Safety Beam Guard Rails and Steel Highway Posts have stood guard alongside the key highways on which war workers, war supplies and military convoys roll safely to their destinations.

Bethlehem Road Products

ROAD JOINTS
REINFORCING BARS AND BAR MATS
DOWELS
DOWEL BAR SUPPORTS
BAR TIES
HIGHWAY GUARD CABLE
CABLE BRACKETS
SAFETY BEAM GUARD RAILS
GUARD RAIL ANCHOR RODS
STEEL HIGHWAY POSTS
STEEL SHEET PILING
STEEL H AND Z PILING
TURNBUCKLES
WIRE ROPE AND STRAND

★ ★ ★ BETHLEHEM STEEL ★ ★ ★

NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.

CENTRALIZED LUBRICATION SYSTEMS—**The Farval Corporation,** Cleveland, Ohio. (16 pp., illustrated) Graphic portrayal of the theory and practice of mechanical lubrication. Opens with a study of machinery lubrication problem and of the economies inherent in system which delivers lubrication to all bearings in exact measured amounts regardless of location. This information is faced by close-up illustration of Farval manual dual-line system at work. Six cutaway drawings in color show how Farval measuring valve operates to deliver measured amount of lubricant and why it can do this without recourse to springs, check valves or small ports. Construction and operation of both manual and automatic pumping units, which provide high pressure source of lubricant supply, are similarly treated. Center spread is devoted to the mechanics of positive mechanical lubrication, and 24 application photographs suggest methods of locating and mounting pumping units and feed lines on different kinds of machinery.

★ ★ ★

WIRE ROPE SHEARS—**Watson-Stillman Co.,** Roselle, N. J. (8 pp., illustrated) Third edition of bulletin describing improved features of hydraulic and hand shears for cutting commercial grade wire rope, flat bars, round bars and varying shapes and metals. Shears are of two types, hand and hydraulic. Hand shear produces clean, fast-cutting with power and ease, weight of shear body being distributed to get perfect balance between maximum cutting strength and minimum manual effort. Hydraulic shear is supplied for bench mounting and also for use on small portable truck. Ram has rack and pinion device for bringing blade to work without labor of pumping. Pump used only for actual shearing operation. Bulletin lists specifications, capacities, spare parts and prices.

★ ★ ★

HEAVY MACHINERY INSTALLATION—**Eichleay Engineering Corp.,** 33 South 19th St., Pittsburgh, Pa. (12 pp., illustrated) Outlines company's facilities for moving and installing heavy machinery without interfering with regular work of plant employees or shop routine. Among typical installations illustrated are 60-ton towers at synthetic rubber plant, heavy steam hammers, forging presses, elevated water tanks, turbo-generator, electric arc furnace, cement kiln, overhead traveling crane and blast furnace.

"The winner of this war will be the side that moves the greatest amount of dirt in the shortest possible time"

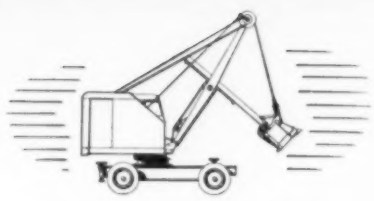
That statement, by a high-ranking officer in the South Pacific area, is graphic proof of the wartime importance of excavating machinery.

Moving dirt—or rock, sand, mud, gravel, shale, coal, coral, snow and ore—fast and efficiently, is a specialty of General-built equipment. And these excavating machines have the built-in stamina, power and adaptability to "go the distance in any kind of going."

You can see the evidence today on a global scale, all as a part of one big job . . . winning this war.

"That goes for the winners of Post-Victory Business, too."

"Civilian Generals," Excavators and Supercranes with long outstanding records, are busier than ever here at home. This performance, and that of their counterparts overseas, has contributed to the blueprints for the all-purpose revolutionary Machine of Tomorrow—



THE GENERAL TYPE 10

WRITE TODAY TO BE READY FOR RECONVERSION DAY!

THE **OSGOOD** COMPANY
SHOVELS, DRAGLINES CRANES
CRAWLER & WHEEL MOUNTS
DIESEL, OIL, GAS, ELECTRIC

Associated with The Osgood Company

GENERAL EXCAVATOR CO.
CRANES-SHOVELS GENERAL OSGOOD MARION OHIO U.S.A.
MARION, OHIO

GENERAL
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

CONCRETE GUN—**Construction Machinery Co.**, Waterloo, Iowa. (8-p. bulletin, illustrated) A post-war message to contractors, house builders, federal, state, county and municipal government construction departments and industrials on the uses of the CMC concrete gun for (1) protecting structures from erosion and disintegration, for coating steel, masonry, wood, rip-rap, embankments; (2) building walls, roofs, partitions, fences, fire retards; (3) waterproofing reservoirs, tunnels, tanks, drains, fissures, water basins; (4) renovating old buildings, barns, factories, industrial plants, reservoirs, bridges; (5) fireproofing wood, structural steel, mines, buildings; (6) preserving brick, concrete, steel, wood, iron, tanks and reservoirs; (7) coating brick, concrete, stucco, masonry; (8) lining water and oil reservoirs, sewers, tunnels shafts, tanks, bunkers, breechings; (9) reclaiming stacks, reservoirs, storage tanks, old structures; (10) repairing bridges, stacks, bunkers, reservoirs; (11) incasing steel, piles, wood, concrete; (12) recoating masonry, brick, tile, concrete, stucco, old buildings and homes; (13) insulating oil reservoirs and tanks, warehouses; (14) sealing mine entries, slopes, shafts, rock cuts, air slacking. CMC gun is built in one size with two variable speeds. In low speed 1¼-in. inside dia. material line is used and 105 cu.ft. of free air per min. at 60-lb. pressure is required. Capacities in low speed can be varied from 1 to 2½ cu. yd. per hr. with engine throttle. In high speed a 1½-in. inside dia. material line is used and 210 cu. ft. of free air per min. at 60-lb. pressure is required. Capacities in high speed can be varied from 2 to 5 cu. yd. per hr.

★ ★ ★

POST-WAR EQUIPMENT BUYING—**R. G. LeTourneau, Inc.**, Peoria, Ill. (12 pp., illustrated) Entitled "A Guide for Your Post-War Equipment Buying," this bulletin answers five "pocketbook" questions which, company claims, every post-war equipment buyer must ask himself, by quoting record number of LeTourneau products manufactured in the last decade alone, by presenting job notes and photographs of fleet owners in all 48 states, by proving LeTourneau's personnel has risen from "catskinner" ranks and knows exact field requirements, by showing that earthmoving machinery manufacture is the company's only activity, and by linking 17 revolutionary job-proved "firsts" introduced to the earthmoving and construction industry.

★ ★ ★

OXYACETYLENE HANDBOOK—**The Linde Air Products Co.**, 30 East 42 St., New York, N. Y. (587 pp., illustrated, price $1.50) Comprehensive and authoritative textbook on basic oxyacetylene welding and cutting procedures. This new, durably bound manual covers the entire range of the oxyacetylene process, giving clear, easy-to-follow instructions for handling all the common commercial metals, together with simple explanations of the fundamental principles of the various methods of depositing and controlling molten metal. Considerable space is devoted to an explanation of the operating principles of oxyacetylene equipment and instructions for its care and maintenance. This is a how-to-do-it book. A few of the many subjects covered are: How to set up, operate, and care for oxyacetylene apparatus; what flame adjustment to use and how to use it; how to weld steel, cast iron and other metals; how to do heating, bronze-surfacing, hard-facing, flame-hardening; how to cut steel, cast iron, stainless steel; how to test welds; how to organize and lay out a welding shop.

QUICK QUIZ FOR CONSTRUCTION MEN

Are These Three Questions on Your Mind?

Q **Can "on the job" lubrication pay for itself?**

A Certainly! Here's a typical case: a contractor paid $1000 for an Alemite Portable Service Station. In 90 days, at 12 hours a day, he had saved 1080 labor hours for lubrication at 67½c an hour. Total net labor saving $729, in the first 3 months! What's more there was a very substantial reduction in required maintenance and in the amount of lubricants used.

Alemite Portable Service Stations are complete power lubrication departments on wheels that carry lubricants to machines on the job. They include high- and low-pressure Alemite Barrel Pumps, Alemite Motor Oil dispenser, hose reels and gas engine air compressor. Write for new catalog.

Q **Can "on the job" lubricating give machines "M. P. T."***

A Yes! In one case, by reducing track roller wear one-third over previous methods, time-outs for repairs were cut more than 30% . . . 30% more "M. P. T."* for the "cats." Another contractor lubricates track rollers in 2½ seconds adding "M. P. T."* to his machines. Do these examples show you how to speed up lubrication?

**More Productive Time*

Q **Can oil and grease be made to beat summer heat?**

A Definitely. Alemite does it by putting an extra-wide operating range into its greases and oils. This gives them toughness, and resistance to heat and pressures that enable them to fight friction in hottest weather. One Alemite grease, No. 33, not only resists heat but it also repels water, endures tremendous loads, can't clog grease guns or bearing lubricant grooves. (Checked up on your lubricants lately?)

Lick "LUBRI-*chaos*" with Controlled "On the Job" Power Lubrication.

"Lubri-*chaos*" can rob you of money, machines and production. Worst of all, you may have "Lubri-*chaos*" in your set-up and not realize it, or today's heavy work schedules may have spotlighted it but given you no answer.

The *answer* is the Alemite method of handling and application of lubricants to your machines right on the job. This method is now proving its worth on construction projects everywhere. It's called the Alemite Portable Service Station and is destined to play an important role in peacetime competition.

Why not call in an Alemite Lubrication Specialist and talk over your lubrication situation. There is no obligation and you'll be gaining the advantage of the world's most modern lubricating methods. Write Alemite, 1840 Diversey Parkway, Chicago 14, Illinois, or Belleville, Ontario.

Another Product of STEWART WARNER

ALEMITE

First in Modern Lubrication

CONSULTATION • ENGINEERING • EQUIPMENT • LUBRICANTS • MAINTENANCE

AIR INLET VALVES—**Simplex Valve & Meter Co.** 68th & Upland St., Philadelphia 42, Pa. (12 pp. illustrated) Provides facts and reference for engineers on installation and operation of air inlet valves used on thin-walled gravity flow lines to eliminate possibility of collapse as a result of sudden drops in the pressure in the pipe line. Nomographs and tables are given for accurate determination of correct positioning, frequency, and size of valves required for trouble-free operation of the gravity flow line. Valve is durably constructed, internally and externally; non-collapsible float which cannot be distorted by pressure is integral with valve. Float is buoyed by water in line until a condition arises which tends to create a vacuum. The buoying effect of the water then is destroyed and the float drops from its seat, admitting air and breaking the vacuum in the line. The valve also serves a dual purpose in releasing air when the pipe line is being filled. Complete details of the principle of installation and operation and the design and construction of the valve are described and illustrated.

★ ★ ★

PRESSED PLATE SECTIONS—**Fort Pitt Bridge Works,** Pittsburgh, Pa. (4-p. folder) Describes 36-ft. hydraulic press which presses plates to accurate dimensions in one operation in any length up to 36 ft. or even longer. In addition a wide variety of special shapes can be pressed accurately. Using this press, sections formerly built up by welding can now be designed and pressed from plates up to more than 6 ft.x¾ in. thick, producing an accurate, finished product. In addition, load carrying plates which formerly required stiffeners can be pressed into load carrying shapes with a saving in weight as well as in fabrication.

★ ★ ★

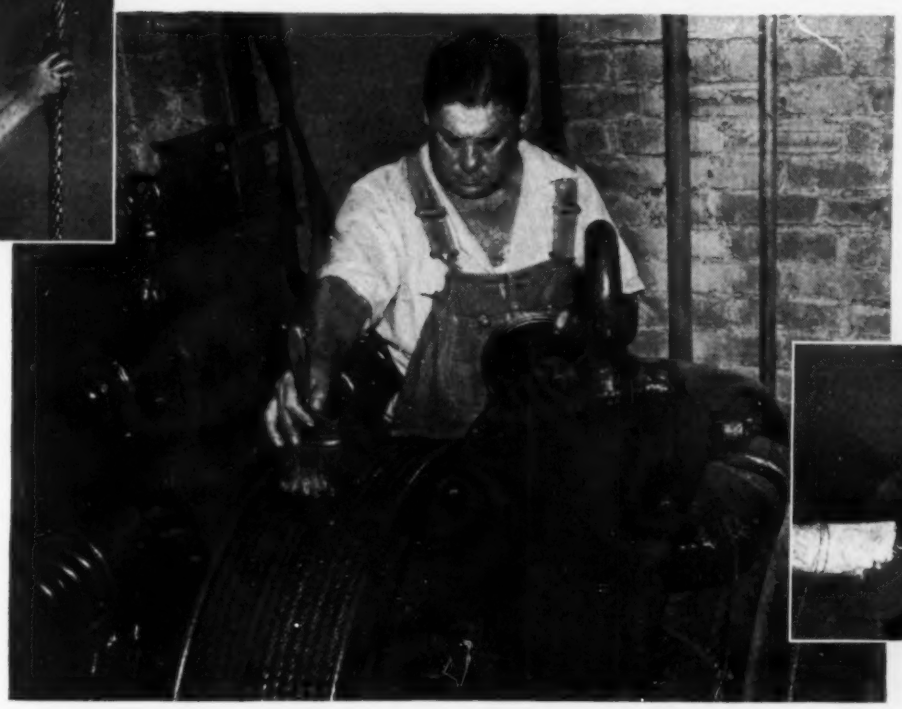
INDUSTRIAL RUBBER CLOTHING—**The B. F. Goodrich Co.,** Akron, Ohio. (4 pp., illustrated) Catalog section describes and illustrates recently introduced line of rainwear and protective garments for industrial needs, including fire coat, general purpose work coat, double back industrial coat, and standard police coat. Also gives details on universal work pants and jacket, workers' leggings, work 'n weather hats and aprons covered with a resin originally designed for laboratory use but now widely used in the mechanical and food industries.

★ ★ ★

PROJECTIVE MAINTENANCE—**Calcium Chloride Association,** 4145 Penobscot Bldg., Detroit, 26, Mich. (8 pp. illustrated) Highway maintenance can be long lasting rather than only sustaining is the view expressed in this new bulletin which points out ways in which calcium chloride can be used from the subsoil to the surface in operations that will result in lasting benefits. Maintenance methods suggested: Post-hole treatment of frost heaving areas as corrective treatment for subgrades (2) addition of stabilized aggregates for strengthening of base courses; (3) conservation of surface materials through additions of binder soil and calcium chloride treatments; (4) widening of paved roads which are too narrow for increased traffic load by construction of stabilized shoulders. Last part of bulletin deals with expediting patching of concrete pavements by use of calcium chloride in concrete mixes for earlier strength and reopening.

Longer Life through

PROPER LUBRICATION



WIRE ROPE is continually fighting a battle-royal with corrosion, friction and wear. Because of the hazards involved, it is neither safe nor economical to use a rope whose original strength has been reduced (by either corrosion or wear) to a point where it no longer affords an adequate factor of safety.

But the safe life span of a wire rope can be greatly extended by keeping it correctly lubricated at all times. The lubricant applied during manufacture will not last indefinitely.

The greatest harm resulting from incorrect or insufficient lubrication is the rust and decay that takes place within the rope. For the most part corrosion is an "undercover" worker as its action is not always visible until too late.

Friction and wear fight hand in hand. Their attack is within *and* without. Every time a wire rope bends there is a sliding movement of both wires and strands where they contact one another. There is also friction where the rope comes in contact with the sheaves and drum.

Proper lubrication will help wire rope win its battle for Longer Life as it lessens friction, promotes flexibility, reduces wear and retards corrosion. The right kind of lubricant to use and the frequency with which it should be applied, depend upon the conditions under which the rope is operating. We shall be glad to give further details on this important subject.

Important: **An idle wire rope is more vulnerable to corrosion than one in use. So be sure to give your ropes the protection of a good lubricant when they are not in service.**

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

HERCULES (RED STRAND) WIRE ROPE

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

BOLTS, NUTS AND RIVETS—**American Institute of Bolt, Nut and Rivet Manufacturers,** 1550 Hanna Bldg., Cleveland 15, Ohio. (24 pp., illustrated) First issue of a publication, "Fasteners," designed to provide factual engineering data on developments involving the use of headed and threaded fasteners. Contents include material on the rolled screw thread process, cold driving of large rivets, standard types of square and hexagon bolts and nuts, and strength of highly stressed bolts and studs. There is also a digest of current information from industrial publications on bolts, nuts, rivets and screws.

★ ★ ★

CONCRETE BINS AND TANKS—**The Nicholson Co., Inc.,** 10 Rockefeller Plaza, New York City. (32 pp., illustrated) Describes methods and equipment for building concrete bins and tanks by the sliding form, continuous pour method perfected by the Nicholson Co. and applied in twenty-four different industries. In building structures by the slip-form method, a single ring of formwork, 4 ft. high, is continuously forced up over the freshly set concrete by screw jacks. The company designs and builds projects under a single contract.

★ ★ ★

Naval Ammunition Depot

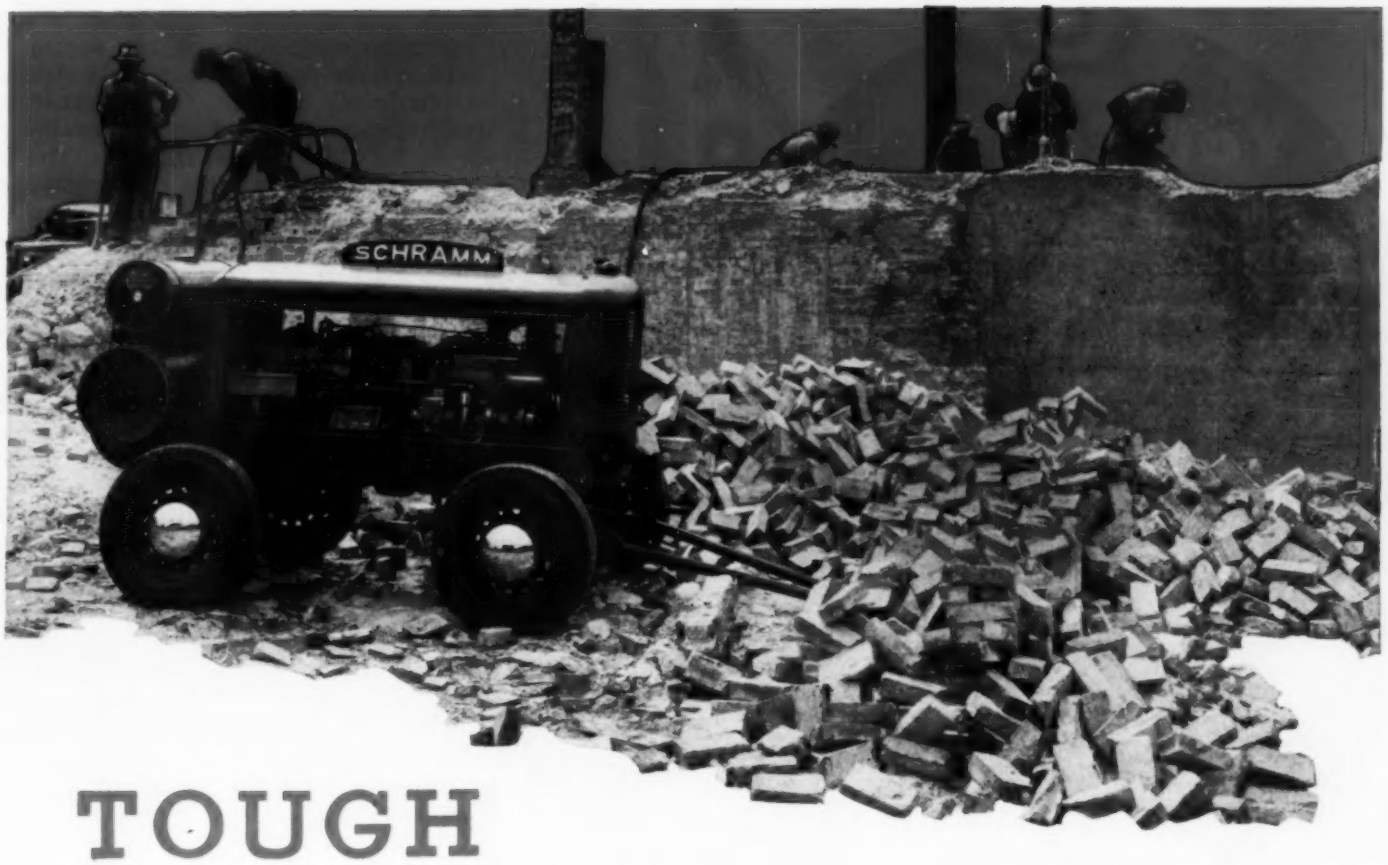
(Continued from page 70)

to raise normal high water to the status of flash floods, so excavation included a high percentage of drainage control and finish grading, including channel changes, revetments, diversion dikes, and diversion ditches.

With 300 mi. of such ditches to con-

(Continued on page 134)

INDUSTRIAL AND PROCESSING BUILDINGS are generally fireproof. More than 2,000,000 sq. ft. of Johns-Manville Transite roof, ceiling and siding was installed.



TOUGH

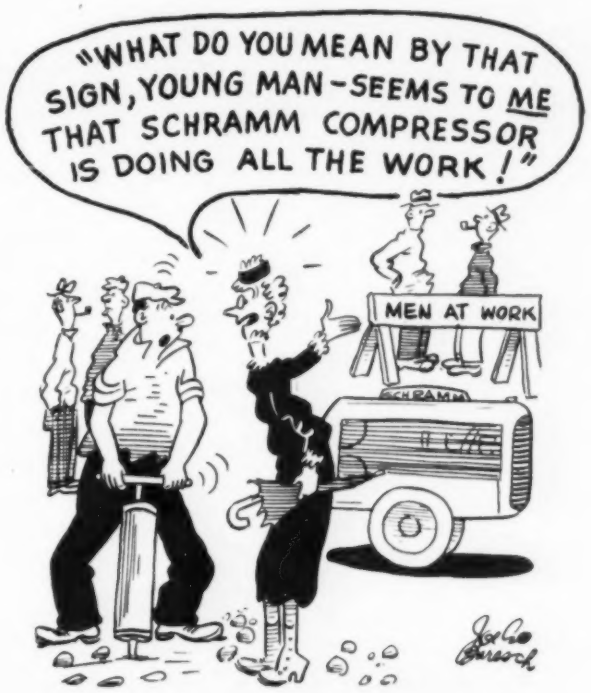
Construction jobs SIMPLIFIED!

Merely by easily moving a Schramm Air Compressor onto the job—and touching a starter button—you get all the compressed air you want—and your construction job becomes a cinch!

On the one hand, Schramm Compressors are rugged, tough "babies"...on the other, lightweight and compact so they can be towed to any job. This means: no job is too tough—and you get air anywhere you want it!

Note these Schramm features: 1. Completely watercooled to provide ideal performance both summer and winter. 2. Electric push button starter. 3. Mechanical intake valve. 4. More cylinders and lighter parts. 5. Forced feed lubrication.

Simplify your construction job by using Schramm Compressors. Write today for list.



SCHRAMM INC. THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA

(Continued from page 132)

struct on steep hillsides, the contractors built a large plow, mounted on a standard LeTourneau rooter. Caterpillar-drawn and operated, it produced approximately 3 mi. of ditch per 8-hr. shift. The low center of gravity of this equipment made it easy to keep ditches straight on any terrain. Only a small amount of cleaning out after the plow was necessary at buildings and in most cases none was done, allowing natural erosion to do the cleaning.

Because of the great expanse of the work and the large number of units being constructed simultaneously, one central batching plant and one central mixing plant were used, supplemented at times by zone central plants utilizing paving mixers. A total of 785,000 cu. yd. of concrete was placed, at times at a sustained rate of 5,000 cu. yd. per day. One and one-half million tons of aggregate from the Wabash Sand & Gravel Co. of Terre Haute, Ind., and 1,000,000 bbl. of cement from the mills of the Lone Star Portland Cement Co. and the Lehigh Portland Cement Co., combined to an aggregate of 30,000 carloads. The Chicago, Milwaukee, St. Paul & Pacific R.R.

(Continued on page 136)

(Continued from page 134)

serving the depot kept these and other thousands of cars flowing smoothly and on time.

Build 1,200 Concrete Igloo Magazines

Approximately 1,200 concrete igloo-type magazines have been built, using Economy steel unit forms. Average handling time was 18 hr. for stripping, hauling and erecting, giving a form cycle of 60 hr. under a construction schedule requiring 150 such magazines per month. Storage magazines with flat-slab roofs and trussed-roof warehouses were constructed, using plywood forms built in panels approximately 4x16 ft., which required 48 hr. from stripping to reerection, giving a form cycle of 96 hr. About 5,500,000 sq. ft. of Johns-Manville membrane waterproofing, installed by Ralph Reeder & Sons, of Indianapolis, on earth-covered magazines was ingeniously treated with a protective cover of two layers of Kraft paper interlaid with limestone talc, so that earth cover fills, proceeding through winter, could subside later without pulling the membrane apart.

For speed and economy magazine floors were poured ahead of superstructures. For winter protection, laminated-arch ribs were built to support tarpaulin covers. The ribs were job-fabricated of 6 plies of 1x4-ft. boards spaced with 2x4-ft. blocks between plies. Radius was produced accurately without processing or preforming. Half-segment arches were formed around stakes and nailed together. The resulting units were easily erected and transported and the cost returned many fold by maintaining steady high volume, regardless of weather. After construction usage, the arches were enlarged by extending several feet on tangent, placed 2 ft. on centers, sheathed and roofed to form permanent storage warehouses.

Concrete Warehouse Construction

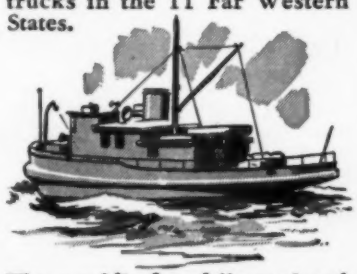
In the construction of two reinforced concrete warehouses, each 300x666 ft. and 42 ft. high, the beam-and-girder roof system precluded the use of the usual rolling and retracting forms. The adaptation used consisted of movable truss-supported platforms on which unit panel forms were erected and which carried the knock-down forms during moving. Trusses were skidded on steel crane girders, permanently set on completed concrete columns. They were designed to carry only the weight of forms and shores while moving; 4x6-in. shores, hung from bottom chord and moving with the platforms, were wedged up from mud sills to take the wet concrete load.

Each building is divided by expansion

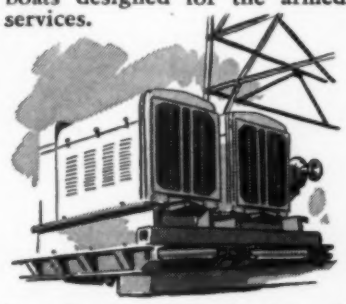
(Continued on page 138)

Cummins Diesel-powered trucks and shovels are a standard combination on major construction, material handling, metallic and non-metallic mining jobs. On the Mesabi Range, for instance, 30 to 40% of the total iron ore output is hauled by truck—the majority of them Cummins-powered.

Late in 1932, the world's first heavy-duty, diesel-powered freight truck went into service. The engine was a Cummins Diesel. Today, Cummins Diesels power approximately 90% of all franchise-operated, long-line, heavy-duty, diesel-powered trucks in the 11 Far Western States.



The world's first fully enclosed type marine diesel—now an accepted feature of marine engine design—was built by Cummins in 1928. Cummins Marine Diesels power fishing boats, work boats, pleasure craft and, today, many boats designed for the armed services.

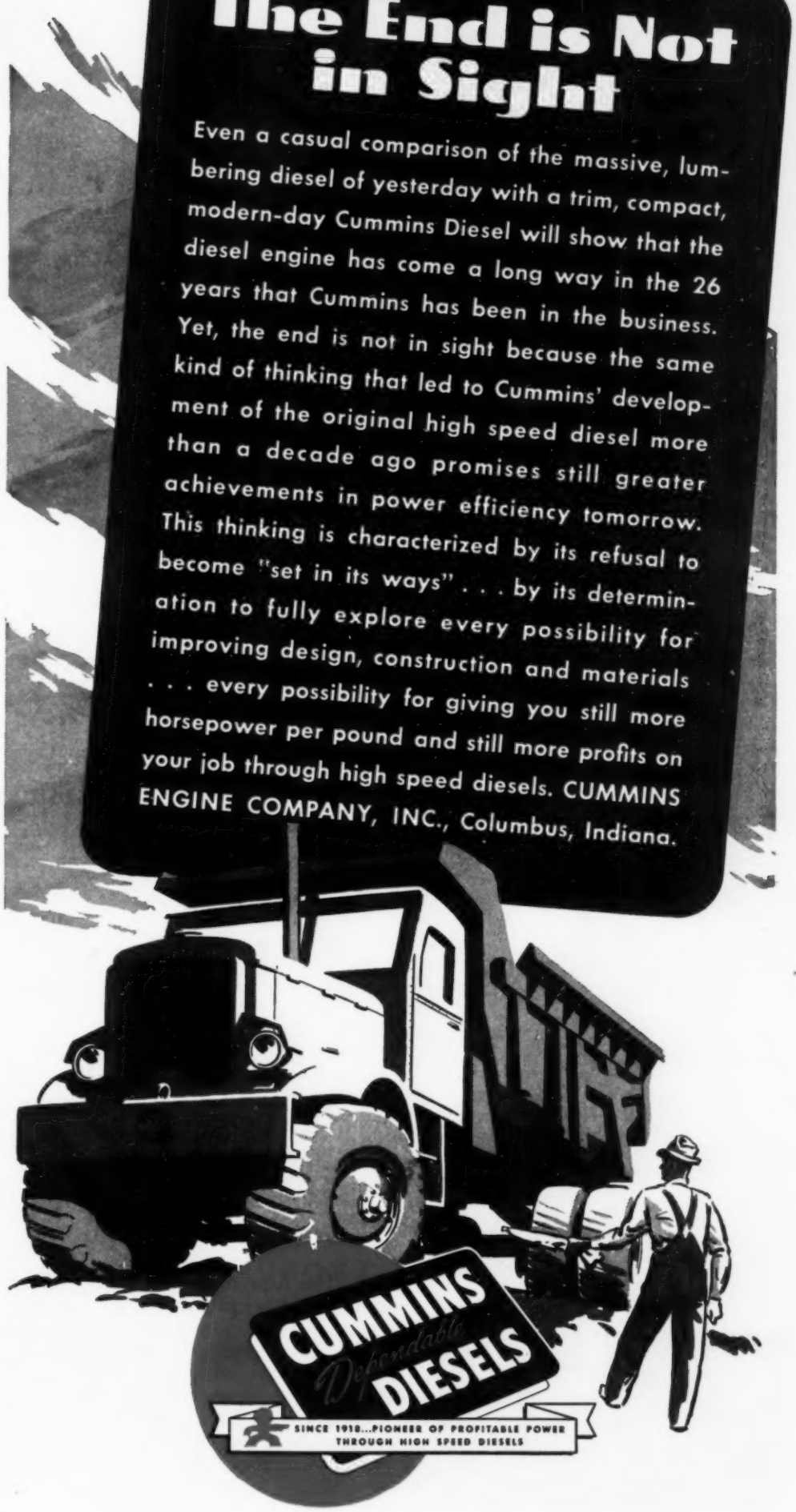


Four Cummins Diesels, three of them seven years old, powered the rig which this year drilled the world's deepest oil well. In this and many other heavy-duty services—logging, construction, and material handling—Cummins Diesels draw the *tough* jobs.

Automotive models • marine engines for propulsion and auxiliary power • power units of all types • stationary engines • generating sets locomotive models

The End is Not in Sight

Even a casual comparison of the massive, lumbering diesel of yesterday with a trim, compact, modern-day Cummins Diesel will show that the diesel engine has come a long way in the 26 years that Cummins has been in the business. Yet, the end is not in sight because the same kind of thinking that led to Cummins' development of the original high speed diesel more than a decade ago promises still greater achievements in power efficiency tomorrow. This thinking is characterized by its refusal to become "set in its ways" . . . by its determination to fully explore every possibility for improving design, construction and materials . . . every possibility for giving you still more horsepower per pound and still more profits on your job through high speed diesels. CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.



(Continued from page 136)

joints into four sections. Enough forms were provided for one complete section, giving eight form uses on the two buildings, but maintaining a full daily pouring schedule. Side bays were poured first, alternate sides on consecutive days, moving forward. This progression permitted placing crawler cranes in the center bay for hoisting concrete to floor hoppers. Placement by buggies thus progressed up the roof slope, with the load wheeled downhill. High-early-strength concrete allowed stripping of forms after 72 hr. Stripping and moving required 3 shifts and the complete form cycle was 10 days. After construction, the trusses were utilized to construct three permanent storage sheds for trucks and buses.

Personnel

In charge of the first stage of the job were Capt. W. B. Short, U.S.N. officer-in-charge of construction; T. L. Jacobi, chief engineer for R. B. Moore & Co.; and C. L. Ohl, general superintendent for Maxon Construction Co., Inc., Dayton, Ohio, of which George W. Maxon is president. So well did they organize that, by the time the depot was one-third completed, they were able to divide the forces and proceed with the construction of a similar depot in another midwest state. Succeeding them were Lt. Comdr. G. H. Carrithers, U.S.N.R., officer-in-charge of construction; J. K. Grannis, general superintendent; and L. H. Harter, chief engineer. The first two have since been succeeded by Lt. A. P. Pasquariello, U.S.N.R., and A. C. Alt, general superintendent.

★ ★ ★

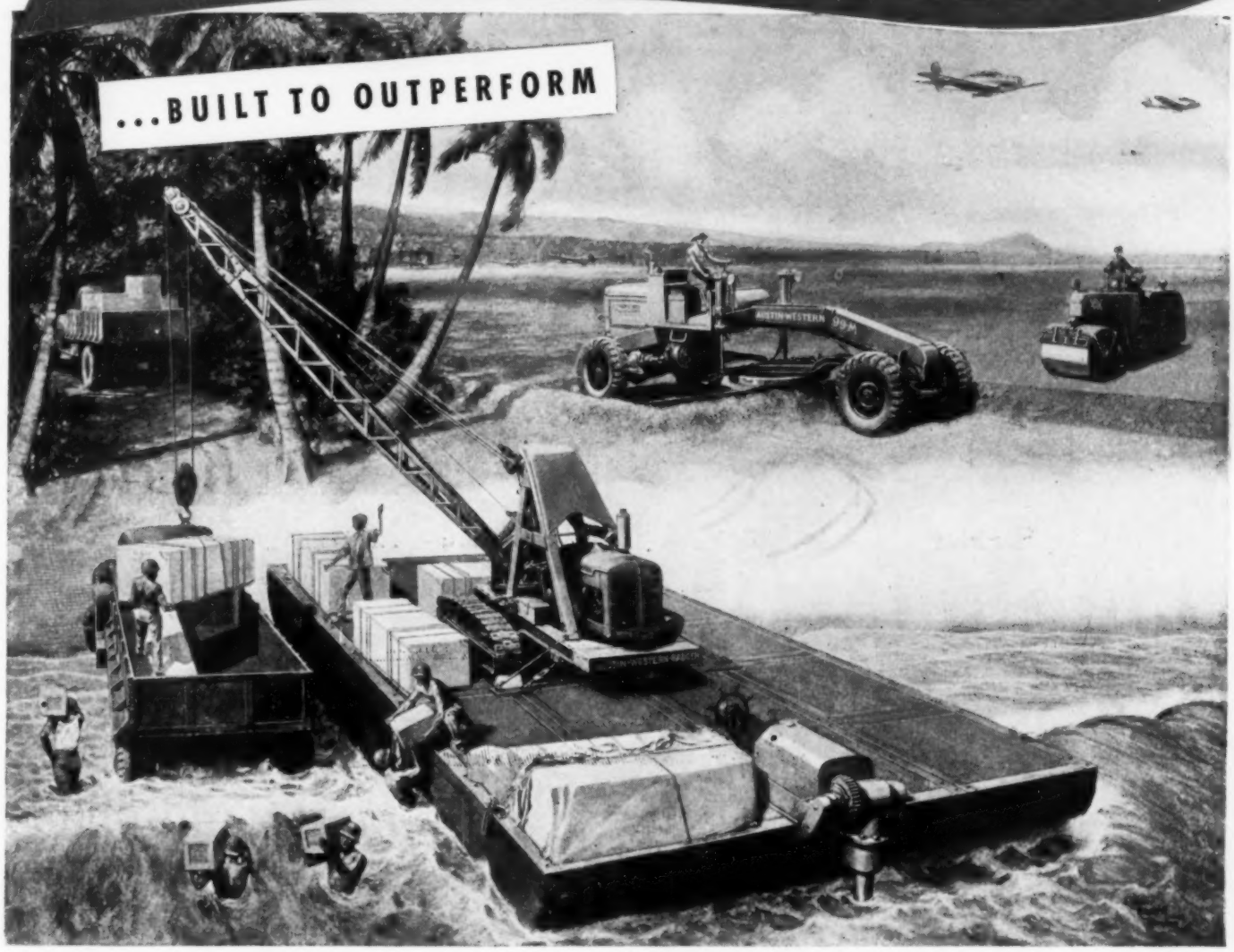
Engineer Equipment

(Continued from page 60)

work. The American 60-in. anti-aircraft searchlight, illustrated herewith, throws an 800,000,000-candlepower beam and is used to spot both low and high-flying targets. It is served by a gasoline-driven, portable electric generator. One of its features is a steel mirror reflector developed by the Corps of Engineers. Tests have shown that the reflecting mirror

(Continued on page 140)

IN WAR as in PEACE



A far cry from the landing fields and construction jobs of peacetime U. S. A., but the same reliable A-W Badger Crane; "99-M" All-Wheel Drive, All-Wheel Steer Power Grader, and variable weight Tandem Roller, helping the Seabees do their magnificent job of building air bases ever closer to Tokyo.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U.S.A.

BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1859

BUY MORE WAR BONDS

(Continued from page 138)

is 90 percent effective after being hit with ten 50-caliber slugs.

Water Purification—Potable water for troops in theaters of war is supplied by portable purification units. One unit, weighing 61 lb., is designed to be carried on one pack board for temporary emergency operation with a hand pump. A larger unit, weighing 129 lb., for carrying on two pack boards, is for extended operation with a power pump. Storage of purified water is provided for by collapsible waterproofed canvas tanks.

All of the equipment here illustrated, in addition to many other units not included in the exhibit, is enabling the Corps of Engineers in the present war to perform work of a character and scope never before achieved. With such equipment the Engineers are carrying out their primary mission which is defined in these terms: "To increase the combat power of our forces by construction or destruction which facilitates the movement of friendly troops or impedes that of the enemy. Engineers give technical assistance to other arms in construction of protective works, in camouflage and by supply and maintenance of certain equipment and materials. They also engage in combat when necessary."

WHEN MOUNTAINS BECOME DRUMLINS*

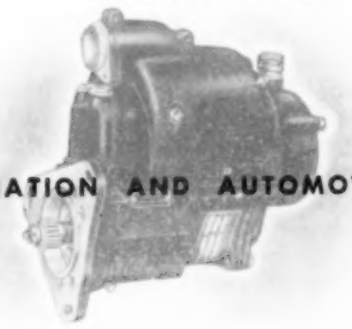
The skilled eyes of warplane pilots over the Alps, of China life-line flyers over the Himalayas and of transport pilots over every other world-famous range will never mistake a mountain for a drumlin. But to plane and engine in the stratosphere, mountains and drumlins are all the same today.

Contributing substantially to engine performance that has pushed service ceilings to seven miles and more are the dependable aviation magnetos flowing from American Bosch assembly lines. Designed for maximum engine power with an extra margin of service-altitude capacity, these magnetos are built to stand the gaff of air temperatures from −70° to +150°, to "carry on" under long hours of gruelling service.

Whether tomorrow's need be more and ever more production for military aviation, or a rapid changeover to win the peace, American Bosch research, design and production will continue to serve all branches of the internal combustion industry.

AMERICAN BOSCH CORPORATION • SPRINGFIELD, MASSACHUSETTS

* *A low hill of glacial origin.*



AMERICAN BOSCH

AVIATION AND AUTOMOTIVE ELECTRICAL PRODUCTS • FUEL INJECTION EQUIPMENT

Palm Leaf Panels

(Continued from page 54)

troop shelter structures in Pacific war theaters is the roof covering, consisting of ivory palm leaves made up into panels, as illustrated. The long leaves, while still green and easily bent, are wrapped around rods of bamboo or other available wood and "stitched" together by interweaving with long, thin slivers of wood or ribs of palm fronds, which readily puncture the green leaves and bind them into a large size roofing unit. In final form the panels resemble, in principle, a fabric drapery hung over a curtain pole. The palm leaf panels, thus prefabricated, are fastened to the rafters of the roof and the studs of the sidewalls like large-size shingles. Work is started with a band of panels along the lower edge of the sloping roof. Successive bands are placed to overlap the ones below them and thus provide a leak-proof roof covering.

An unusual feature of the operation of sawmills to process into dimension lumber the logs obtained by felling trees in the locality is the application of standard army mine detectors to the logs before cutting. Trees near the sites of camps where buildings are to be erected have usually been subjected to heavy bombing and artillery fire both by our own and enemy forces and often have embedded in them steel shell fragments which would break the teeth of the circular saws used to cut them up. By going over a log with a mine detector before cutting it up, the presence of metal fragments in the wood is disclosed, the fragments can be removed, and casualties to circular saw blades are thus reduced.

★ ★ ★

London Shelters

(Continued from page 83)

on the surface are great. It had been evident for some time that additional underground facilities from north to south in Inner London would be of great public value. The proposals outlined were for an "express" tube, to be constructed parallel to the existing lines, which would thus be relieved of the longer distance.

(Continued on page 144)

TYPICAL DIESEL LUBRICATION PROBLEMS:

3. Ring-Sticking

Ring-sticking usually results from deposits formed by the combination of the residues of oxidized lubrication oil and fuel with fuel soot.

In four separate ways, RPM DELO prevents the formation of these deposits:

1. RPM DELO is manufactured from a carefully selected base oil containing natural inhibitors highly resistant to oxygen. It contains no heavy residues which may be left behind to act as a binder for the fuel soot.

2. RPM DELO contains an added oxidation inhibitor which greatly reduces the rate at which the oil absorbs oxygen.

3. RPM DELO has chemical detergent properties. The compounding material reacts with the oxyacids to render them essentially inert so that they are no longer able to polymerize to form gums and lacquers.

4. RPM DELO has peptizing properties which enable it to maintain soot and oxidation products in suspension in minute particles. This prevents these materials from settling from the oil and forming engine deposits.

RPM DELO, moreover, is non-corrosive to all types of bearings, does not foam and has very high metal adhesion qualities at both high and low temperatures.

RPM DELO is marketed throughout the United States and many foreign countries under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial-RPM DELO (concentrate).

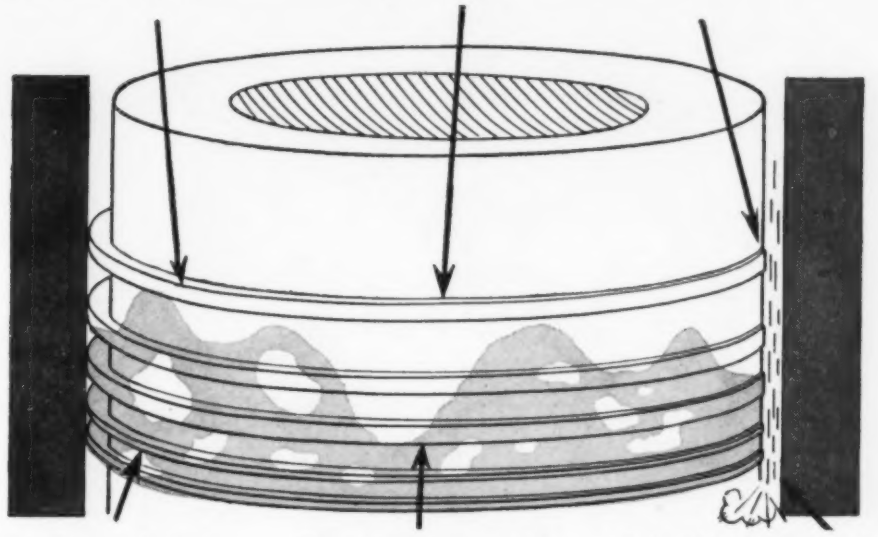
☆ ☆ ☆

HOW RING-STICKING OCCURS

Decomposition products of fuel and lubricating oil deposit in ring groove, behind ring and in side-clearance space.

Rings stick in grooves, no longer expanding to form tight seal between piston and cylinder wall.

With seal broken, hot, high pressure gases "blow-by" stuck ring.



Escape of gases reduces compression, overheats piston, increases oil deterioration.

Blow-by pressure removes lubricating oil from rings and cylinder, leaving dry spots.

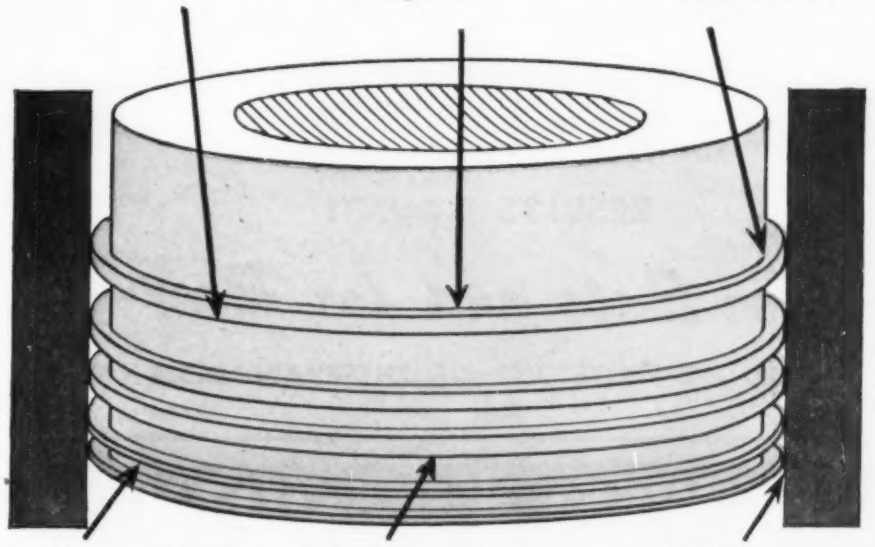
Lack of lubrication results in high ring and liner wear and scratching.

HOW RPM DELO PREVENTS RING-STICKING

Detergent in RPM DELO prevents deposition of oxidation products.

Ring grooves are kept clear, allowing ring tension to maintain tight seal.

RPM DELO clings to ring surface, maintaining lubricant film and seal.



Tight seal eliminates blow-by, maintaining compression and power.

RPM DELO adheres to hot surfaces, protecting entire surface of rings, piston and liner.

RPM DELO lubrication results in minimum ring and liner wear, eliminates scratching.

RPM DELO

STANDARD OF CALIFORNIA

(Continued from page 142)

or through traffic, in at least the inner zones.

Construction of the tunnel shelters was directed by the London Passenger Transport Board, the civil authority which administers the existing underground railways. The order for their construction, as part of the air-raid shelter project, was placed by Britain's Ministry of Home Security. By this cooperation, although the decision for construction of the tubes was not taken until December, 1940, construction proceeded with the least delay and the shelters have, for a long time, been available as a place of maximum security.

Shelters consist of two parallel tubes, each 1,200 to 1,400 ft. in length, and 16½ ft. in diameter. For the purpose of the shelter, the tunnels have been given two floors, one at the bottom, and the other slightly above the center of the tube. There is thus adequate headroom, about 6 ft. 10 in., and air space on each floor. The shelters have full ventilation, sanitation, medical aid posts, canteens, and three separate telephone systems. All the shelters have five exits to the streets.

Five experienced tunnel contractors began work simultaneously. Shafts, eventually used to house the access staircases, were sunk through clay to the required level. These shafts are 16½ ft. in diameter, and are lined with cast-iron segmental rings. The tunnels themselves, however, are mostly lined with similar rings of reinforced concrete. From the bottom of the access shafts, the shelter tunnels were driven in a horizontal direction.

The bulk of the excavation was done by hand labor with compressed air tools. The erection of the tunnel lining followed close on excavation. As soon as every two lining rings had been erected, the annular space between the outside of the lining and the clay was grouted solid. The gang at the clay face usually consisted of one leading miner, two other miners and four laborers. On this basis, the maximum rate of progress was about two rings, or 40 in., per shift. It was later found possible to extemporize primitive shields, and progress reached a maximum of 12 rings or 20 ft. per day.

Electric power for lighting, ventilation, cooking, and sanitary services is provided from two separate sources—the L.P.T.B.'s railway mains and from the local public supply.

Ventilation

The ventilation of these deep shelters demanded careful planning. In summer weather, it was to be expected that the "natural temperature" of the shelters—made up by animal heat and the lighting

(Continued on page 146)

PLAN NOW TO REPLACE

Obsolete Equipment

WITH THE FASTER POWER OF TOURNAPULLS

YOU'LL GET MORE POWER FOR
DIRTMOVING . . . LUG LESS
DEADWEIGHT . . . WORK FASTER

movers with years of experience on actual earthmoving jobs. They know that speed and stoutness pay. You get both in Tournapulls.

Tournapulls move more dirt . . . move it faster and cheaper . . . because their working weight compared to power and capacity is much less than slower, track-type outfits—

Prime Mover and Equipment	Super C Tournapull & 15-Yd. Carryall	Tractor & 15-Yd. Scraper Approx.
Weight of Combined Units	31,000 #	53,500 #
Lbs. of Weight per Horsepower	207	411

Note that this difference in weight is the equivalent of 7.5 pay yards. Can you afford to lug that much deadweight back and forth on a 10,000-hour working life when you could be moving pay dirt with a Tournapull?

BIG TIRES REDUCE MAINTENANCE

Note, too, that the Tournapull has 150 brake horsepower for its working weight of 31,000—plus the flotation of big drive tires (21 x 24). These large tires give you plenty of traction with a minimum of wearing parts . . . also cushion the equipment against shock and reduce operator fatigue.

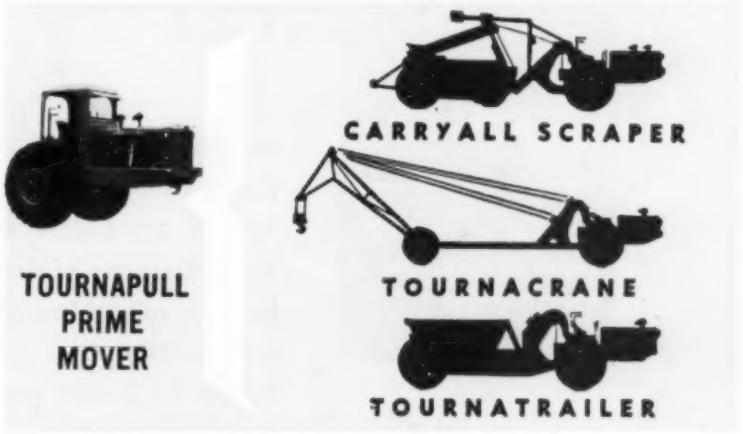
NO CHANGE IN OPERATING METHODS

With Tournapulls you use the same time-tested LeTourneau operating methods that have proved so successful with tractor-scraper outfits—downhill loading, pushers for big-capacity scrapers, working cuts and fills in series, etc. But Tournapull speed enables you to complete round trips in ⅓ to ½ the time.

Why use slow-moving, overweight equipment, when you can have faster-moving, job-proved Tournapulls? You'll pay less, move more yardage . . . more profitably. Plan NOW to replace obsolete equipment with faster powered Tournapulls.

Only *TOURNAPULLS*
Give You This Interchangeability

Cable control, with the job-proved LeTourneau Power Control Unit, makes possible these cost-cutting combinations—all with the same Tournapull prime mover.



Write today for this "Postwar Equipment Folder". Tells what to look for and why in selecting future construction units. Address your request to Dept. CM-844 , R. G. LeTourneau, Inc., Peoria, Ill.

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*Trade Mark Reg. U. S. Pat. Off.

(Continued from page 144)

load, added to the naturally high temperature of the intake air—would be high. A uniform system of ventilation was adopted for all eight shelters. Fresh air is taken from suitably reinforced "pill-boxes" on the surface. Vitiated air is extracted by exhaust ducts in the roofs of each tier of shelters.

The dual power supply and the fact that ventilating fans are installed in two widely separated pairs, gives good protection against complete failure of the ventilating system, whether accidental or resulting from enemy action. Tests carried out in the tunnels indicate, moreover, that tolerable conditions can be maintained with only one fan in operation. Even if a complete failure were experienced, the deterioration of the air in the tunnels would take place slowly enough to provide ample time for the transfer of the occupants to other shelters.

The presence of these large new ventilating plants, situated along the most densely used inner sections of the railways, should result in a considerable improvement of air conditions in the tubes when converted to railway service after the war. Extensions and alterations to undergound railways are peculiarly diffi-

(Continued on page 149)

Don't let a "LAZY" oil shelve your shovels

...keep equipment on the "GO" with hard-working TALPEX

SHELL

TALPEX

THE NEW, ALL-PURPOSE, HEAVY-DUTY LUBRICANT

For trucks, busses, tractors, shovels, stationary and marine Diesels

TO BE EFFICIENT, the oil used in today's Diesels, with their faster speeds and closer tolerances, must do more than just lubricate. An oil that doesn't is "lazy," causes trouble.

Shell Talpex can never be accused of being "lazy." It's a two-fisted, heavy-duty lubricant that has *all* of the properties necessary for efficient, wartime Diesel operation. That's the reason many operators who have switched to Shell Talpex find their Diesels running for longer periods of time between overhauls, and with greater operating efficiency.

Why not give your equipment *all* of the following advantages of this hard-working lubricant?

NEW SHELL TALPEX

Is Non-Corrosive to alloy bearings. Protects all lubricated engine parts against corrosion.

Has Exceptional Oxidation Stability. Holds to a minimum the formation of sludge, lacquer and other deterioration particles.

Has High Detergency. Helps keep carbon, lacquer and foreign particles from adhering to pistons and rings, valves, ports.

Has Low Carbon-Forming Tendency. Reduces ring sticking and wear. Lengthens engine life.

If the oil you now use doesn't have *all* these properties, it's lazy . . . should be changed to hard-working Shell Talpex. Ask the Shell man to show you why.

(Continued from page 146)

cult things to carry out. In the inner London area, for example, traffic ceases for only about 5 of the 24 hr.

In the area served by these railways lives nearly one-fifth of the total population of Britain. Even before the war, several millions of them found the underground railways an indispensable traffic link in their daily lives. After the war, the underground railways, unlike most civil services, will have some concrete gains to show, in spite of the interruption of normal development.

★ ★ ★

Scrapers

(Continued from page 73)

along the steep face. Excavation of the slope to the bench was a fairly simple process because of the soft materials encountered. A 12-percent grade roadway open at the east end was then constructed by bulldozers and scrapers up to the bench, to facilitate digging operations and to provide a roadway to the bench for future cleaning.

Traffic conditions precluded anything but the lightest blasting of stubborn rock. Practically all the rock removing work is done with a 7-ton Wooldridge ripper plow provided with two teeth and hauled by a Caterpillar D-8 tractor. It is swung out to the edge of the cut to uproot the earth and boulders. Large rocks are quickly snubbed with a steel cable and then pulled back by tractors to where they can be picked up by the scrapers. Four 22-yd. Wooldridge scrapers also powered by D-8 Caterpillar tractors, are in constant operation. Standing by are two Lorain shovels of ¾-yd. to 1½-yd. capacity to aid in the excavation when the going gets too tough for the scrapers. The contractors expect to employ these on only one fifth of the work.

Throughout the excavating, motor traffic continues along the much traveled highway, except for short interruptions of perhaps 3- or 4-min. periods. Only three flagmen are necessary. One stationed on top at the point of operation and one at each side of the cut. When the traffic begins to pile up, work along the edge is halted and transportation is allowed to continue until thinned.

Because of the necessity of confining the work to one locality at a time, only 20 highly trained men are employed on each of two 8-hr. shifts. Work on all three cuts is to be completed sometime in December.

Standard-Gage Railroad

(Continued from page 79)

civilians using hand baskets and donkey panniers until mechanical plant became available; but lack of dump-trucks necessitated excavated material being spoiled at the tops of cuts and the fill for embankments being obtained from borrow pits.

Difficult rock excavation was encountered on the actual coastline, and at Maameltein Headland alone a quantity of 35,000 cu. yd. had to be excavated wholly in limestone rock and removed by hand.

It was necessary at various points to build a large number of retaining walls and sea walls up to a maximum height of 28 ft. The majority of these walls were built of masonry facing filled with concrete and plums. At places, foundations had to be constructed in up to 8 ft. of water and work was made very arduous by rough seas and difficult access.

The nature of the country traversed—rivers, ravines and wadis—necessitated a high proportion of bridges, including five of 100 ft. or more multiple spans. Location and design depended to a great extent on the availability of spans, which all had to be transported long distances and were usually in short supply. The three bridges here described are characteristic of the type of work involved.

Bridge Construction

Nahr el Kelb bridge consists of one 70-ft. through-span and two 100-ft. lattice girder through-spans. A considerable amount of water was encountered, and all available pumps had to be put into use. The northern abutment was founded at 9 ft. below water level, but the southern abutment and piers had to be taken to 24 ft. below water. At about 9 ft. below water level a band of heavy loam was reached, and the additional skin friction stopped the downward movement of the caissons. The cutting edges were cleared of obstructions, the caissons allowed to fill with water and charges of gelignite were ignited and dropped into the caisson well. This produced the desired result and sinking was continued until a safe depth was reached. When the pumps reached their lifting capacity, a diver and grab were utilized for the final lowering. All caissons in this bridge were sealed under water by means of a crane and grab bucket and they were pumped

(Continued on page 152)

Our troops inspect a captured Axis tank, looking for booby traps.
INTERNATIONAL NEWS PHOTO

Every battle is a showdown . . . our men, weapons and equipment against the enemy's . . . *wire rope* included. That's why our forces need the best rope they can get . . . *and lots of it.* Below are some of the ways in which *you* can help to send more wire rope over there by making your own rope *last longer* over here:

1. Start with the correct wire rope. If uncertain about size, grade or construction for your specific job, ask us or any distributor.

2. Check equipment thoroughly. Repair or replace worn, corrugated or wobbly sheaves. Line up sheaves with each other and with drums, making sure rope does not rub against flanges. Inspect drums for roundness.

3. Install rope carefully. Avoid kinking when unreeling and handling. Never drag rope across concrete or gravel. Wrap rope snugly and evenly on drum, avoiding cross-winding.

4. Break in rope cautiously, gradually increasing speeds and loads. And break in the operator, if inexperienced. Instruct him in the importance of smooth starts and stops . . . reasonable loads . . . frequent examination of rope, sockets, clips and splices.

5. Care for your rope. Clean and lubricate regularly. On many installations rope can be cut off or shifted to distribute wear. Get better acquainted with ropes by sending for our free Industrial Wire Rope Hand Book and Riggers' Hand Book.

One thing more: Use wire rope of known stamina and dependability. *Preformed* Yellow Strand combines flexibility, toughness, elasticity and strength in proper balance. It stays on the job . . . curtails replacements . . . helps you keep manpower and equipment producing . . . for Victory.

Broderick & Bascom Rope Co., St. Louis

Branches: New York, Chicago, Houston, Portland, Seattle
Factories: St. Louis, Seattle, Peoria

YELLOW STRAND
PREFORMED WIRE ROPE

(Continued from page 150)

dry when the sealing concrete had set. Masonry was used throughout on the superstructure as an outside finish and took the place of formwork for the concrete cores of piers and abutments. The steelwork was erected on falsework.

At the Litani River Bridge (four 40-ft. spans) the water depth was 7 to 12 ft. with a width at water level of 120 ft. at low flow. A trial boring on one bank showed no rock down to 80 ft., the subsoil being alluvial beds of clay, sand and gravel. It was decided to build the bridge on double timber pile bents, using 12x12-in. timber. Piles were driven between 50 and 60 ft. below bed level before taking up the necessary set. As the longest timber obtainable was between 30 and 35 ft., splicing was necessary and piles were butt-joined and finished with M.S. plate on all four sides. All joints were either below bed level or above water level where they could be adequately braced. The timber bents were designed so that additional girders were added, one on either side of the main girders, giving the bridge sufficient width to be used as a road bridge.

At the Damour River Bridge (four 60-ft. spans) it was noticed that after the next winter's floods much scour had taken place. Steel sheet piling in 20-ft. lengths was, therefore, driven round the two most threatened piers and the intervening space filled with concrete.

Tunnels

The Ras Chekka headland near Tripoli, thrusting out in a sheer promontory dropping 800 ft. into the sea, has throughout history impeded north and south movements along the coast of Syria. This headland had to be pierced by a 4,823-ft. tunnel while in the approach from the south a low ridge was negotiated by a short tunnel of 565 ft.

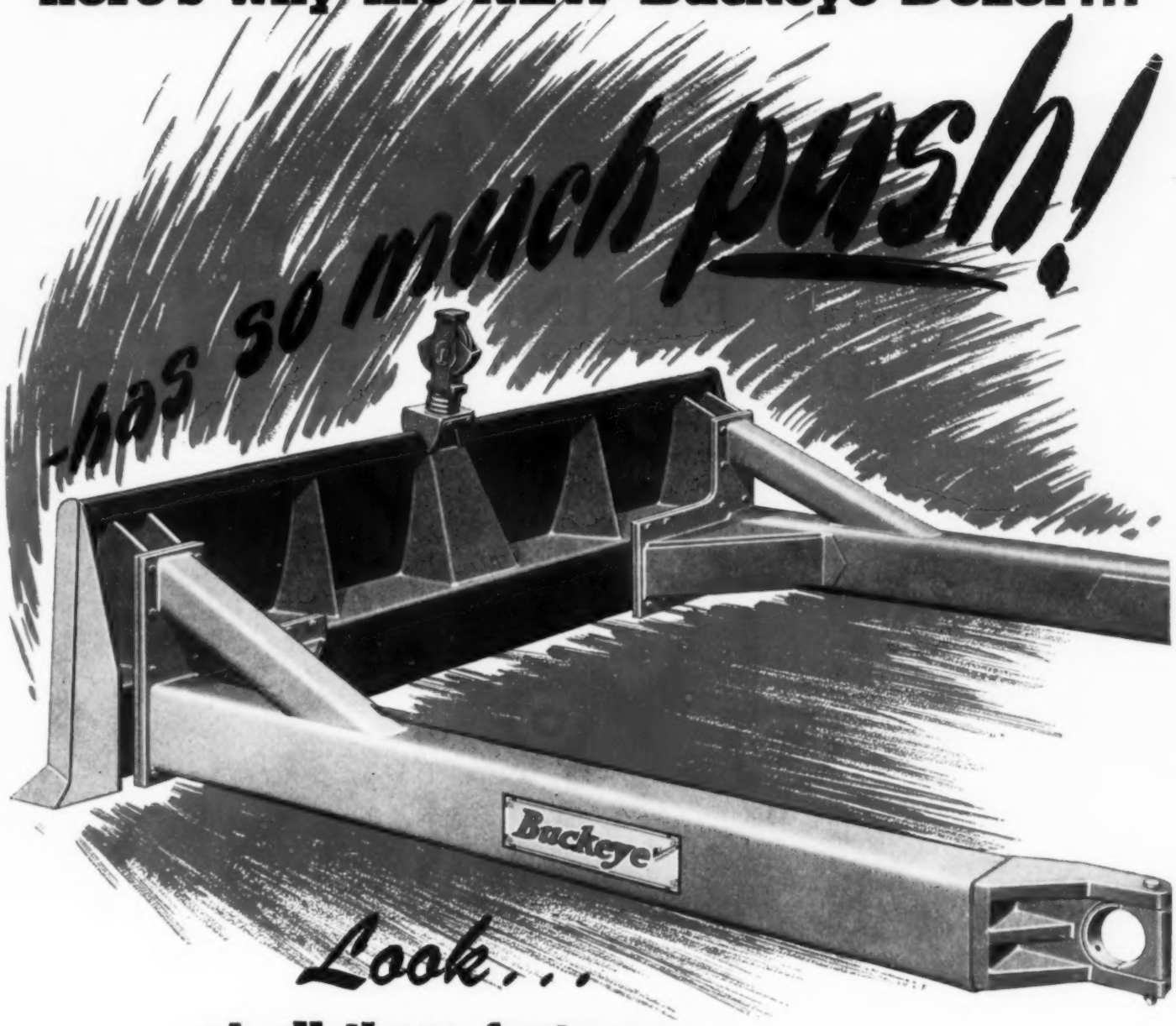
The northern approach to the main tunnel presented a major task in that the alignment followed the sea line at a height of about 12 ft. and lay immediately below the road, which thus required extensive retaining walls both above and below the rail level. Tunnelling work was carried out from both ends and from two intermediate adits, giving six available faces. The northern end of the tunnel involved slow and laborious mining methods as at this portal entry had to be effected immediately under the main coastal road and through built up ground lying at the base of a 600-ft. cliff. Entry at the north adit was also made through spoil fill by close timber sets until solid was reached. The south adit position allowed of direct entry by ordinary methods and was more straightforward.

One section of the northern tunnel

(Continued on page 154)

here's why the NEW Buckeye Dozer...

...has so much push!



Look... at all these features

- Rugged construction
- Simple design
- Moldboard reinforced horizontally and vertically
- Sturdy push frame
- Curved blade to roll bigger loads
- No useless excess weight
- Natural digging action
- Straight direct center lift of moldboard
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- Reversible cutting edge
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The new Buckeye Center Lift Dozer has them all. It's the dozer that can stay on the job, leveling, grading, back-filling, uprooting trees, clearing underbrush — rolling bigger yardage loads with minimum lost time for repairs and maintenance.

Write today for specifications

THE BUCKEYE TRACTION DITCHER CO.

Findlay, Ohio

(Continued from page 152)

passed through a marl formation which rapidly decomposed to clay and mud on exposure. In virgin state this rock mined like a compact shale and broke in "block" form, often with a conchoidal fracture. At the time of mining, an experimental section was hand smeared with cement to determine whether a skin protection of this nature would adhere and prevent the weathering action. After four months this section still appeared unaltered and it was decided to Gunite spray the whole marl section of the tunnel.

At Ras el Bayada, a little north of the Palestine-Syrian frontier, a headland with a sheer cliff face was negotiated by a heavy side-cut section. During construction the terrific seas encountered and the extremely severe curves necessary made it desirable subsequently to cut a bypass tunnel 4,170 ft. long, and this followed conventional lines.

This 120-mi. railroad was in use for traffic within a year of commencing construction and was brought to a finished state with good running top in a year and a half.

The construction will rank high in the achievements of military railway engineering.

Preventive MAINTENANCE

STARTS WITH *CLEAN OIL!*

. . . And CLEAN OIL Means—

- **More Efficient Motor Performance**
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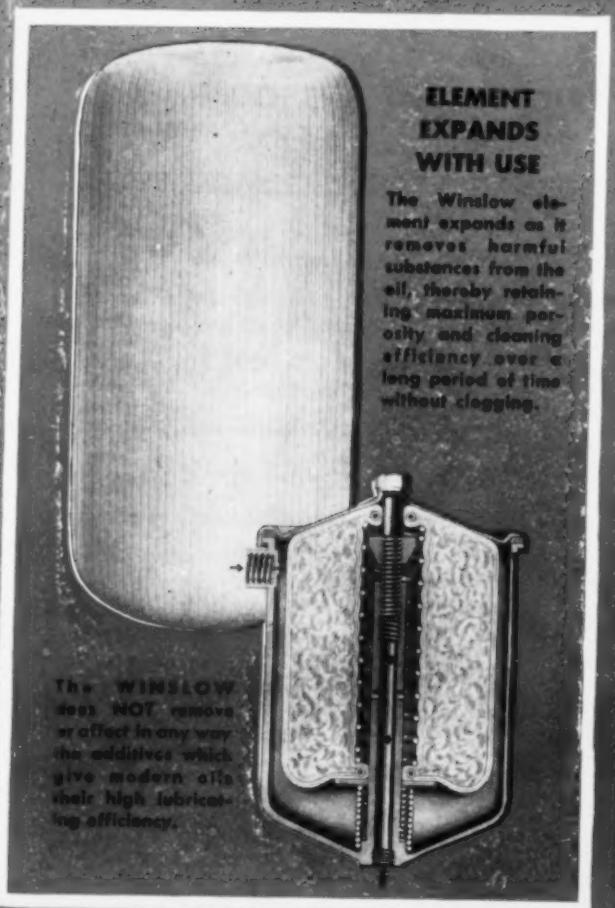
WINSLOW OIL CONDITIONING

Cleans-up Engines and Keeps 'em Clean!



Never before was it so important to keep motor equipment rolling without interruption, and to conserve vital materials and man hours. Never was the job of maintenance so great a problem.

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Good oil alone does not insure good lubrication. It must be kept CLEAN . . . free of varnish, sludge, dirt, grit, carbon and acid products of combustion.

WINSLOW OIL CONDITIONING helps good oil perform the function for which it is intended . . . by trapping all harmful substances, absorbing the varnish, and neutralizing the acid forming elements. Winslow filter elements not only clean oil efficiently . . . they are constructed for HIGH CAPACITY and LONG LIFE!

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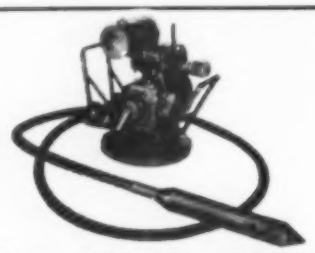

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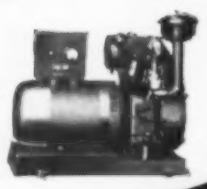

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2—Pumps are—Type L.S. Size 42" x 36"—48,000 G.P.M.
31 Ft. Hd. 319 R.P.M.—500 H.P.—2200 Volts—3 Phase—60 Cycle

1—Pump is—Type L.S. Size 42" x 36", 35000 G.P.M.
31 Ft. Hd. 350 R.P.M. 2 Speed 2200 Volts—3 Phase—60 Cycle

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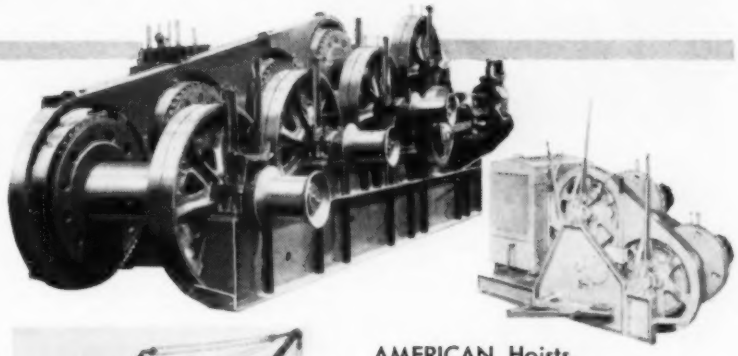
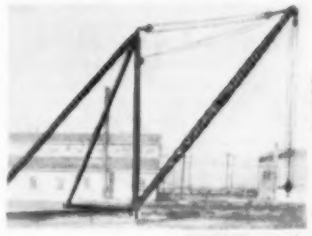
Whatever your requirements—from a small one-ton hoist to a large, powerful, multiple-drum hoist for 250-ton derricks and larger, whether for steam, gasoline, electric or diesel power—you can't beat the modern-design AMERICAN Hoists for this method of materials handling.



AMERICAN Hoists.

DERRICKS

There is a variety of materials handling that can be taken care of best by an AMERICAN Steel Derrick. In the Guy, Stiffleg, Steel Erector's, and Special Types, a wide choice in size, length of boom and lifting capacity offers versatile, economical derrick application.



AMERICAN Steel Derricks.

REVOLVING CRANES

AMERICAN REVOLVERS offer the ultimate in reach, lifting capacity, and maneuverability in materials handling for dams and similar construction projects. Over the years these large gantry mounted revolving cranes have proved a natural for placing forms and reinforcing steel, pouring concrete, and stripping forms.

AMERICAN REVOLVERS. 4437

Plan now . . . but wait for **AMERICAN!**

AMERICAN **MATERIALS HANDLING** *for* **EVERY INDUSTRY**

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Wherever wire rope is fastened . . . . use genuine **CROSBY CLIPS** *with the Red-U-Bolt*

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Struck load or heaped load — it's all the same to the Timken Tapered Roller Bearings in the wheels of Gar Wood Scrapers. They have the radial, thrust and shock load capacity necessary to provide more than enough support under any and all operating conditions.

They keep the wheels turning smoothly because frictional resistance is practically eliminated; for the same reason, lubrication is greatly simplified and lubricant saved. Wheel stability is greatly increased too, because of the line contact of the rolls and raceways and the spread of the bearings in the wheel hubs.

In addition to the wheel applications, Timken Bearings also are used in the Gar Wood Power Control Unit by which all scraper movements are controlled. This unit can be seen mounted on the rear of the Allis-Chalmers Tractor shown hauling the scraper.

Gar Wood Industries, Inc., knows from long experience what Timken Bearings mean in performance and economy — and so do users of Gar Wood equipment. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

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TAPERED ROLLER BEARINGS